Posttraumatic Growth in Firefighters

A thesis submitted in partial fulfilment of the requirements of Nottingham Trent University for the degree of Doctor of Philosophy

This research programme was carried out in collaboration with the UK Fire and Rescue Service

December 2017

Lisa Sanderson

Contents

4

Table of Figures and Tables

Acknowledgments

I owe a huge debt of gratitude to a great many people who have supported me on this journey, least of all a fabulous bunch of fellow students at NTU, who were always there to cheer me on when the going got tough. I am also extremely lucky to have had the unfaltering support of a great family and wonderful friends who have never once complained when I was too busy working on my PhD to do the things that they wanted to do.

However, I owe a special debt of thanks to my fantastic supervision team. My second supervisor, Dr Duncan Guest, whose statistical expertise is second to none and who challenged me to think in ways I would otherwise never have done throughout this journey. He has inspired in me an excitement for numbers, which I never would have thought possible. However, my biggest debt of gratitude goes to my Director of Studies, Dr Rowena Hill, whose enthusiasm, kindness and unfaltering support will never be forgotten, and without which, this would probably never have been possible.

To all the firefighters that have given up their time to take part in this study, I can only say thank you.

However, I dedicate this thesis to my favourite Nephew, because I want him to know that with hard work and determination anything is possible.

Abstract

The term posttraumatic growth is used to describe the experience of positive change that occurs as a result of the struggle with highly challenging life crisis (Tedeschi & Calhoun, 2004) and there is a growing body of literature that attests to this idea that adversity can lead to personal gain. Dominant models of growth suggest that experiencing a traumatic event can lead to the disruption of an individual's core beliefs, resulting in cognitive rumination, which in turn transforms into constructive processing thus initiating the development of posttraumatic growth (Cann et al, 2010). Various variables, such as personality, coping, resilience, age, sex and time have all been associated with posttraumatic growth, within the extant literature. The aim of the thesis was to address a gap in the existing literature by developing a model of posttraumatic growth within a critical occupation, the UK Fire and Rescue Service (FRS), thus allowing further investigation of the relationship of such variables to posttraumatic growth. This was achieved through a sequential mixed methods approach using two empirical studies. Study one used Grounded Theory (Glaser & Strauss, 1967) to develop the model and study two tested the model using inferential statistics and structural equation modelling. The vast majority of participants in study two, (88%), experienced some degree of posttraumatic growth following exposure to work related traumatic incidents. In line with dominant models of growth, firefighters who experienced posttraumatic stress symptoms reported higher levels of posttraumatic growth. However, posttraumatic growth was also reported by firefighters who were not currently experiencing any symptoms of posttraumatic stress. There was a significant association between time since the traumatic event and posttraumatic growth but no differences in relation to participant's age or sex, which may be reflective of the unique culture of the FRS. Personality factors of extraversion and neuroticism were found to be significant predictors of posttraumatic growth as were five coping strategies; reinterpretation and growth, active coping, focus on and venting of emotions, mental disengagement and the use of emotional social support. The overall findings have both a theoretical and applied relevance as they contribute to a more comprehensive understanding of both the negative and positive effects that experiencing a traumatic incident can have on an individual and suggest possible interventions that could help firefighters perceive positive benefits from their work.

Chapter One: Introduction to Thesis

1.1 Overview

According to O'Leary and Ickovics (1995) model of discontinuous change, exposure to trauma can result in three possible outcomes: survival, recovery and thriving. Those who merely survive never regain their previous levels of functioning, those who recover return to their previous level of functioning but those who thrive move beyond their original level of psychosocial functioning, flourish and grow as a result of their experiences (O'Leary & Ickovics, 1995). This experience of thriving has been called posttraumatic growth (Tedeschi & Calhoun, 1995). Despite much research being carried out in this area, inconsistency of findings means that it remains largely unclear why some individuals grow in the aftermath of trauma whilst others do not (O'Leary, Alday, & Ickovics, 1998). However, the majority of this research has been conducted using clinical samples, which could be considered somewhat biased and may have led to misdirected understandings of posttraumatic reactions. Thus, in order to improve understanding of the complexity of possible reactions to traumatic events, research is needed that focuses on a non-clinical population, one that, despite being routinely exposed to traumatic events, are not showing signs of pathology.

Emergency services personnel, such as firefighters, police and paramedics are routinely exposed to traumatic events as part of their daily working lives, thus putting them at risk of developing symptoms of posttraumatic stress or even posttraumatic stress disorder (Brunsden & Lawrence, 2012). However, despite facing these ongoing stressors, the majority of personnel remain healthy and it is only in rare cases that individuals actually experience such a high level of reaction (Brunsden, Hill, & Maguire, 2012). The existence of posttraumatic growth within emergency services personnel has been documented in the literature (Shakespeare-Finch, Smith, Gow, Embelton, & Baird, 2003; Shakespeare-Finch, Gow, & Smith, 2005; Armstrong, Shakespeare-Finch, & Shochet, 2014). However, very little empirical work in this area has been carried out with the UK Fire and Rescue Service. Therefore, this thesis will address this gap in the literature and provide a model of posttraumatic growth within a critical occupation, the UK Fire and Rescue Service, offering an original contribution to knowledge.

A sequential mixed methods approach was used as this enabled the development of a model of posttraumatic growth and the subsequent testing of this model across a large sample of FRS personnel. Grounded theory (Glaser & Strauss, 1967) was used to develop the model and this was subsequently tested using inferential statistics and structural equation modelling.

1.2 Aims and Objectives

This thesis explores the experiences of posttraumatic growth, using a sample of Fire and Rescue Service personnel within the UK, and in doing so aims to:

- Develop a model of posttraumatic growth within a critical occupation

- Inform the posttraumatic growth literature on the performance of this model for single traumatic events versus cumulative traumatic exposure

- Expand the contours of the posttraumatic growth literature by identifying the correlates and predictors of posttraumatic growth.

- Expand the contours of the literature detailing cognitive appraisal and reappraisal of traumatic events

- Establish a new contour in the posttraumatic growth literature outlining the typology and prevalence amongst firefighters

- Establish methods for educating firefighters about posttraumatic growth

- Inform the posttraumatic growth literature on the effect of age, sex, length of service and time since the traumatic event occurred on individual's experiences of posttraumatic growth within a developmental organisation, the UK Fire and Rescue Service.

- Establish an empirical evidence base to inform practical methods to develop a positive culture within the fire and rescue service community to facilitate posttraumatic growth and outline methods to achieve this.

1.3 Research Questions

These research questions were initially constructed from reviewing the literature and then subsequently further developed once the data was transcribed and analysed from the qualitative study. They were grouped into clusters and are retained throughout the thesis to aid reader navigation and identification.

A – Prevalence/nature of posttraumatic growth (PTG)

1. Is there PTG in this population?/ what is the prevalence of PTG in this population?
2. What is the prevalence of posttraumatic stress in this population?
3. Can PTG exist in the absence of posttraumatic stress?
4. Is PTG cumulative or related to a specific event?
5. Are their sex differences in PTG in this population?

6. Is PTG in this population an enduring phenomenon? (I.e. to what degree is this growth sustained?)

B – Longitudinal/temporal aspects of posttraumatic growth (PTG)

1. Can we disaggregate between what is naturally occurring growth over a life span and PTG?
2. Can we disaggregate between what growth is attributable to working in the FRS as opposed to engaging with traumatic incidents?
3. Is there a rescue personality? Which personality factors are associated with PTG?
4. Is PTG continuous or is there a ceiling point that is reached where no more growth occurs?
5. What is the effect of time since the traumatic event on the development of PTG?

C – Associations/relationships with other factors/concepts

1. What is the relationship between core beliefs and PTG?
2. Is there a relationship between the extent to which firefighters perceive that training prepares them for the job and PTG?
3. Is this population resilient?/ What is the relationship between resilience and PTG?
4. What is the relationship between coping strategies and PTG? – (do these strategies promote/enable/facilitate PTG?)
5. Is this PTG real or is it actually illusory? Is reported PTG actually a coping strategy?
6. What is the relationship between PTG and well-being?

1.4 Original Contribution of the Thesis.

This thesis will make an original contribution to knowledge by developing a model of posttraumatic growth within a critical occupation. Although a number of models have previously been developed they have been developed using general population samples. Currently the dominant model of growth is the one proposed by Calhoun and Tedeschi (2013), which asserts that posttraumatic growth is experienced in five different ways; personal strength, new possibilities, increased closeness to others, increased appreciation of life and positive spiritual changes. Critics, however, argue that it is possible that some individuals will experience growth in a way that does not fit into one of these five categories (Pals & McAdams, 2004), and this has led to calls for more qualitative research to enable evaluation of individual's subjective experiences of posttraumatic growth following traumatic exposure (Ramos & Leal, 2013). The current research aimed to address these calls.

Although a good deal of research investigating posttraumatic growth has been conducted in the last twenty years the majority of this has been undertaken using general population

samples who engage in a wide variety of traumatic events (Paton, 2006). Very little research has looked at emergency workers, and in particular firefighters, whose daily working activities means that they are likely to be repeatedly exposed to traumatic events (Berger et al, 2012). Firefighters deal with a wide variety of complex and hazardous situations, which include dealing with fires, road traffic accidents, providing first aid to casualties, suicides and handling dead bodies (Moffitt et al, 2014). Thus, in contrast to the general population who experience a wide variety of traumatic incidents in differing circumstances, firefighters experience trauma while undertaking their daily working activities. Furthermore, there are some important differences in the way that firefighters experience trauma as compared to the general population (Brunsden & Lawrence, 2012). In the general population most traumatic stress exposure is rare, unexpected, unpredictable, individual and passively received in contrast to firefighters whose engagement with trauma is both routine, expected, and actively engaged in (Brunsden, Hill, & Maguire, 2014). Additionally firefighters exposure to trauma is generally transient as the incidents they have to deal with, such as road traffic collisions, tend to be over relatively quickly (Tuckey & Hayward, 2011) and instead of operating individually they always work as part of a team, 'the watch', and thus they experience trauma in the context of being part of this group. Research has suggested that between 56% and 88% of emergency workers have been exposed to at least one traumatic incident (Bryant & Harvey, 1996; Alexander & Klein, 2001; Haslam & Mallon, 2003; Del Ben, Scotti, Chen, & Fortson, 2006). This makes them an ideal population with which to explore the effects of traumatic exposure and any positive as well as negative adaptations in response to trauma. Emergency workers are considered to be at higher risk of developing posttraumatic stress disorder than the general population (Haslam & Mallon, 2003) and although inconsistencies exist in prevalence rates, figures as high as 20% have been reported (Heinrichs et al, 2005). Current models of growth suggest that posttraumatic stress is the catalyst for posttraumatic growth (Joseph, 2012) and if this is the case firefighters would appear to be an ideal population for further exploration of the factors that are associated with posttraumatic growth.

To date there has been little research exploring positive post-trauma outcomes in work-related populations and in particular, the emergency services (Armstrong, Shakespeare-Finch, & Shochet, 2014). Research that has been undertaken in this area has focused on the occurrence and prevalence of posttraumatic growth and there is limited research exploring the factors that relate to posttraumatic growth in these settings. However, there may be elements of the contexts in which firefighters experience trauma that can help explain the process of posttraumatic growth. For example, the Fire and Rescue Service has specific ways of coping and social support systems in the workplace that may influence these outcomes (Armstrong et al, 2014). Unique and close co-worker networks exist within the Fire and Rescue Service, which form both an operational and emotional team engendering the formation of a collective identity (Brunsden & Hill, 2009) and the creation of a fictive family

(Brunsden, Hill, & Maguire, 2014). Seeking support from this fictive family appears to be firefighters preferred coping strategy (Chamberlin & Green, 2010) and it may be that this strong social support is acting as a stress buffer for firefighters (Regehr, 2009). A positive relationship between social support and posttraumatic growth has been demonstrated in general population samples (Prati & Pietrantoni, 2009) as it may be that this support promotes deliberate rumination and rebuilding of shattered assumptions following trauma (Calhoun & Tedeschi, 2013). Although firefighters do have an elevated risk of developing posttraumatic stress disorder (Corneil, Beaton, Murphy, Johnson, & Pike, 1999) the majority of firefighters do not develop psychological problems as a result of dealing with traumatic incidents (Lambert, Benight, Harrison, & Cieslak, 2012). Exploring posttraumatic growth within the fire service therefore offers a useful way of exploring current theories of growth, particularly in the following areas:

- Dominant models of growth suggest that posttraumatic stress is the catalyst for posttraumatic growth (Joseph, 2012). However, although firefighters have repeated exposure to potentially traumatic events and thus an elevated risk of developing posttraumatic stress disorder (Corneil et al, 2012) the majority of firefighters remain healthy (Brunsden, Hill, & Maguire, 2012). However, research with firefighter samples has consistently demonstrated the existence of posttraumatic growth (Armstrong et al, 2014; Kehl et al, 2014) and therefore, it is possible that there is a pathway to posttraumatic growth which does not involve posttraumatic stress. The current research will allow exploration of alternative pathways to growth.

- Current models of growth developed with general population samples rest on the implicit assumption of trauma resulting from a single event whereas the work undertaken by firefighters mean that they are repeatedly exposed to potentially traumatic events. Thus, the current research allows for exploration of cumulative traumatic exposure and therefore, also potentially cumulative growth.

- Social support is an integral part of Calhoun & Tedeschi's (2013) model of growth as supportive others can not only provide comfort but offer new ways of looking at what has happened thus promoting deliberate rumination and the revision of existing schema. Members of the Fire and Rescue Service have particular workplace social support systems in place and rely primarily on social support from colleagues as they believe anyone who has not shared their experiences could never really understand (Brunsden, Hill, & Maguire, 2014). Given that the majority of firefighters never require the professional therapeutic interventions that are available to them (Brunsden & Lawrence, 2012) it would appear that these close co-worker relations are acting as a stress buffer through the provision of social support (Regehr, 2009). Thus, the current research will allow an in depth exploration of social support which is a central tenant of the process of posttraumatic growth.

- Debriefing processes are also related to the core mechanisms proposed to be operating in the process of posttraumatic growth. Some research has suggested that

self-disclosure about one's reaction to a traumatic event influences the process of posttraumatic growth as disclosure is associated with deliberate rumination about the event ((Lindstrom et al, 2013), which allows individuals to find meaning in their traumatic experience which ultimately leads to growth (Calhoun & Tedesch, 2010). Debriefing processes, critical incident stress debriefing (CISD), one-to-one debriefing and even more informal discussions (Jeanette & Scoboria, 2008) are widely used within the Fire and Rescue Service to manage firefighter's exposure to traumatic incidents (Brunsden, Hill, & Maguire, 2014). Thus, the current research will allow further exploration of the relationship between debriefing and posttraumatic growth.

1.5 Synopsis of Thesis

An overview of the contents of each chapter is provided below.

Chapter One – Introduction to Thesis

Chapter Two – Review of Contextual Literature

- Outlines the structure and organisational culture of the UK Fire and Rescue Service and the changing nature of the work that the Fire Service currently undertakes.

Chapter Three – Review of Existing Literature on Posttraumatic Growth

- Provides a comprehensive review of the existing literature on posttraumatic growth.

Chapter Four – Methodology

- Outlines the methodology that is used in this thesis. This includes the rationale behind the sequential mixed methods design and provides detailed justifications for both the quantitative and qualitative methods used together with comprehensive descriptions of the analyses.

Chapter Five – Empirical Study One - Qualitative study

- An empirical chapter, which charts the development of the grounded theory model of posttraumatic growth that was constructed from the lived experiences of firefighters.

Chapter Six - Operationalising the Grounded Theory Model of Growth

- Details the process that was used to move from the grounded theory model of growth that was developed from the qualitative data in study one to an operational

working model that could be empirically tested on a large sample of Fire and Rescue Service personnel.

Chapter Seven – Empirical Study Two - Quantitative study

- Explores the second empirical study and presents the results obtained from both descriptive and inferential statistics, with reference to the research questions set out in section 1.3.

Chapter Eight – Structural Equation Model

- Presents the results of structural equation modelling that was used to test the model of posttraumatic growth, the development of which was charted in chapter five.

Chapter Nine – Summary and General Discussion of Findings

- This last chapter provides a summary of the results and discussions of the previous chapters, together with practical implications from the findings. Limitations and strengths of the research are also discussed and suggestions made for future research. Finally, the unique contribution of this thesis to the research area is outlined.

(Throughout this thesis, the term firefighter will refer to an operational firefighter, a member of the FRS who has responsibility for responding to incidents.)

1.6 Conclusion to chapter

This chapter has outlined the rationale for this thesis, which is to further our understanding of the complexity of possible reactions to traumatic events by developing a model of posttraumatic growth within a critical occupation.

The next chapter will outline the structure and organisational culture of the UK Fire and Rescue Service and the changing nature of the work that the Fire Service currently undertakes in order to provide the context in which the research programme was undertaken.

Chapter Two: Review of Contextual Literature

2.1 Introduction to Chapter

This chapter will outline the structure and organisational culture of the Fire and Rescue Service and the changing nature of the work that the Fire Service undertakes within the UK. Whilst it will draw on the academic literature in the area, it also draws on personal observations made by the researcher who undertook several familiarisation visits to a number of Fire Stations at the beginning of this thesis and continued to engage with practitioners throughout the development of the thesis. This reflects the researcher's belief that in order to produce real world research that is useful and pertinent, academics need to gain an appreciation and understanding of the specific occupational, environmental and social context of the organisations they seek to study (Brunsden et al, 2012).

2.2 The Structure of the UK Fire and Rescue Service

At the time of writing there are 52 Fire and Rescue Services (FRS) within the UK which typically, although not always, geographically represent a county. According to Government statistics (2017), there were 42,300 full-time equivalent Fire and Rescue Authority staff in England as of 31-March 2016, which represents a decrease of 4% from the previous year and a 16% decrease from five years earlier. This figure includes both operational (personnel who respond to incidents such as fire and road traffic collisions) and support staff (such as personnel involved in training and control operatives). The majority of operational staff are predominantly male and white, although the number of females and those from ethnic minorities has been steadily increasing; the proportion of firefighters in England who are women has increased from 2.5% in March 2005 to 5% in March 2016 and the proportion of firefighters declaring themselves as minority ethnic in England has increased from 2.3% in March 2005 to 3.8% in March 2016. According to Government statistics (2017), however, the population of England, mid 2017, was approximately 55,268,100 of which approximately 50.6% were females, whilst approximately 13.6% of the total population were from ethnic minorities. Thus, it is apparent from the figures that the FRS is still a long way from being fully representative of the communities, which they serve.

Operational staff can be either whole time or retained. Whole time staff have full time employment with the Fire and Rescue Service whereas retained staff are on call firefighters who may have full-time employment outside the Fire and Rescue Service but respond to emergency calls within their local area as and when required. As the Fire and Rescue Service provide cover 24-hours a day, 365 days per year the majority of whole time staff work a shift pattern. Although this shift pattern can vary between services, it typically consists of two-day shifts of 9am to 6pm followed by two night shifts of 6pm to 9am followed by four days off-duty. This pattern is then repeated throughout the year. Full time day crewed firefighters also exist and work only during the day, which could be either Monday–Friday or 42 hours within Monday-Sunday. Most managers work a flexi-duty system, which means

they work a 9-5 day, five days a week but for certain periods they are on call to provide cover for major incidents.

There are approximately 18,000 retained firefighters providing fire and rescue cover to around 60% of the UK. Most retained firefighters are based in rural areas and will crew one or two appliances at a solely retained fire station, however some are based in urban areas on stations alongside whole time crews. Retained crews will be called upon to attend the full range of incidents including fires, floods, road traffic collisions and chemical spills, working along their whole time colleagues at many incidents. Retained personnel are required to attend the fire station for weekly training sessions but other than that, they carry pager alerts, which activate when they are needed and they have a maximum of five minutes to report to their station and mobilise the necessary appliances.

Operational personnel (up to the level of station manager) work in teams known as watches, of which there are four, Blue, White, Red and Green watch and each watch is typically made up of seven firefighters. Members of the watch work very closely together often over a number of years and the academic literature has identified that these close co-worker relations can lead to the development of fictive families; for example, the term 'brotherhood' is used widely internationally to describe firefighters fictive families and the strong co-worker loyalties that exist (Regehr, Dimitropoulos, Bright, George, & Henderson, 2005). The peer support provided by the watch is particularly important, as firefighters can be extremely resistant to external professionals in terms of support for psychological distress, as they believe that someone who has not shared their experiences can never understand how they are feeling (Brunsden & Lawrence, 2012). There is, however, some literature that contradicts this arguing that they want an outsider with no value judgements to talk to (Greene, Kane, Christ, Lynch, & Corrigan, 2006). Given that the majority of firefighters do not typically access the professional therapeutic interventions that are available to them, it would appear that these close co-relations are acting as a stress buffer through the provision of social support (Regehr, 2009).

The role (previously known as ranks reflecting the FRS original militaristic culture) structure within the Fire and Rescue Service is clearly defined and denotes the chain of command of its operational management. The roles are shown on the helmets that firefighters wear and on the collars of their uniforms as epaulettes.

The role structure and associated duties in the UK Fire and Rescue Service
Firefighter – carries out day-to-day duties of firefighting and fire safety work (see section 2.3 for more detail)

Crew Manager – In charge of the watch at smaller fire stations or the crew of a fire appliance. Carries out day-to-day firefighting and fire safety work. They will attend incidents as officer in charge of an appliance and will also take command of small-scale incidents (involving up to three fire appliances). In the event that three Crew Managers arrived at the

scene of an incident command would remain with the original Incident Commander, then a Duty Officer would be mobilised and they would take over on arrival. They will also undertake specialist duties such as training or fire safety.

Watch Manager - In charge of the watch at larger fire stations. Carries out day-to-day firefighting and fire safety work. As they manage the watch, they are enacting HR policies, managing and leading the team as a group as well as on the fire ground. They will attend and command as officer in charge incidents, which involve up to three fire appliances and can also undertake specialist duties such as training or fire safety.

Station Manager - Responsible for management of a fire station (including management of Watch Managers, firefighters assigned to that station and equipment) or day-to-day work in a specific policy area. For example, this could involve liaison with local schools if there is a strategic service level risks identified with young people in the area. They may assist the Group Manager in delivering this work. They could also be responsible for delivering training or be involved in multi-agency initiatives. Also operational in that they will take charge of large-scale incidents (involving up to six fire appliances) or undertake specialist tasks such as support at an incident.

Group Manager - Responsible for management of a group of fire stations or day-to-day work in a specific policy area. For example, liaising with Police, Local Government or other agencies, delivering joint initiatives or being responsible for training or the fleet. They will take charge of major incidents (involving up to nine fire appliances) or undertake specialist tasks such as support at an incident.

Area Manager - Part of the senior management team, responsible for day-to-day management of an area of fire service operations or policy. They will take charge of major incidents or undertake specialist tasks such as support at an incident.

Assistant Chief Fire Officer - Part of the senior management team, has operational responsibilities and will take command of major incidents (involving 10 fire appliances or more)

Deputy Chief Fire Officer - Part of the senior management team, responsible for support functions (typically including personnel, finance and estates) and deputises for the Chief Fire Officer during their absence. They will take command of major incidents (involving 10 fire appliances or more).

Chief Fire Officer (or CEO) – Head of the organisation and responsible for the overall running of the organisation.

The qualitative study of this thesis (see chapter five), sought to capture the experiences of dealing with traumatic incidents across as many of these roles as possible as different roles

have different levels of exposure to traumatic events. However it is likely that all roles have had direct exposure to traumatic incidents as until recently all Fire and Rescue personnel (with the exception of specialist professional staff) joined the organisation as a firefighter and then progressed upwards through the roles.

Staff employed in the control room also work in shifts exactly the same as the operational fire crews. When they receive a 999 call from a member of the public, they will take the relevant information and pass this on to the nearest fire station (providing they have available resources). Alarms will sound in the receiving station signalling to personnel they have what is called 'a shout' and they will immediately proceed to the fire appliance (known as 'pumps'). Typically four-six firefighters crew the fire appliance and each firefighter is allocated a specific role at the beginning of the each shift which denotes where they sit in the appliance i.e. firefighter in charge will sit in the front beside the driver and firefighters allocated to wear breathing apparatus (BA) will occupy the back seats nearest the doors. It is not unusual for the watch to receive updates from the control room enroute to the incident.

On arrival at the incident the incident commander (the most senior officer and as such could be the crew manager, watch manager or station manager) will assess the situation and decide upon a plan of action, brief the team accordingly and delegate tasks as appropriate. In reality when attending smaller incidents members of the watch who regularly work together appear to have an implicit understanding of what needs to be done, know each other's strengths and weaknesses and will get on and do the necessary with little instruction.

If a large or complex incident occurred, (such as the 2005 Buncefield fire which started because of an explosion at an oil storage terminal and involved 25 fire engines, 20 support vehicles and 180 firefighters) then the gold-silver-bronze command structure, a hierarchical framework of incident management used across the emergency services, would be activated. Although this is used across the emergency services the roles of each function do not equate exactly and at the time of writing working groups are looking at standardising this procedure.

Table 2.2.1

The Gold-Silver-Bronze Command Structure

Gold	Strategic	Usually located geographically away from the incident a gold commander is in overall control of their organisations resources at the incident and is responsible for formulating a strategy for dealing with the incident and the initial planning of the recovery after the incident.
Silver	Tactical	Usually established outside the immediate geographic location of the incident but still nearby. The silver commander is the tactical commander who manages tactical implementation following the strategic aims given by gold and makes it into sets of actions that are completed by bronze.
Bronze	Operational	A bronze commander will be found with their staff working at the scene and directly controls the organisations resources at the incident.

2.3 The Changing Nature of Firefighters Work

The classic image of the firefighter often silhouetted against the background of a raging inferno and accompanied by stories of heroism and personal sacrifice is perpetuated by the media in our culture (Childs, Morris, & Ingham, 2004). However, in reality there is a contradiction between the ways in which firefighting as a job is conceptualised by those outside, as opposed to those inside of its everyday routines (Thurnell-Reid & Parker, 2008). The downward trend in fires and fire deaths over the last decade (a 53% reduction in the total number of fires according to UK Fire Statistics) have led to significant changes in traditional firefighting work, as have changes in legislation and organisational and role restructuring. Firefighter roles in the modern FRS are actually dynamic and evolving as well as sometimes routine and boring (Childs et al, 2004). For example, part of a typical day will involve testing, maintaining and cleaning the equipment as well as training, which for some areas is increasingly undertaken online. In the UK the introduction of the Fire and Rescue Service Act (2004) made prevention and rescue activities such as attending road traffic accidents, dealing with natural disasters, responding to terrorist incidents and community fire safety work a statutory responsibility (Matheson, Manning, & Williams, 2011). Whilst still an emergency response organisation, prevention work now carries equivalent importance. As a result, firefighters now spend a considerable amount of time actively engaging with households and businesses providing guidance and advice on a host of community safety issues (Andrews, Ashworth, & Meier, 2014). According to Government statistics in 2015-2016, for example, the FRS in England conducted 581,000 home fire safety

checks alone. There has also been a growing trend for the FRS to attend floods and water incidents over the last decade. An estimated 70% of England's FRS were involved in the aftermath of the UK floods of 2013-2014 during which time firefighters attended over 7,000 incidents and performed over 2,000 rescues (The Fire Brigades Union, 2013). More recently, in January 2017, 15 Fire and Rescue Services mobilised teams to areas of the UK at risk of flooding following severe weather conditions (The Fire Brigades Union, 2017). With Defra's, Climate Change Risk Assessment projecting a significant increase in flood risk across the UK it is likely that this aspect of their organisational work will continue to increase.

In addition the FRS were given the duty to promote safer communities with the introduction of The Police and Justice Act (2006) with the result that firefighters have become increasingly involved in youth work, developing and delivering a number of interventions to schools aimed at encouraging responsible fire behaviour, discouraging dangerous driving, fire setting and hoax calls (Matheson, Manning, & Williams, 2012). Thus, modern day firefighting is both multi-faceted, changing rapidly and increasingly community orientated and geared towards customer service, which necessitates a changing skill set; one that requires good interpersonal skills, sophisticated communication, collaboration and organizational skills (Kirschman, 2004) all of which have significant implications for recruitment and training. Increasing demands for accountability from government and the community, new technologies and new approaches to personnel development are just some of the factors that make it likely that the operating environment of the FRS will remain subject to change (Childs et al, 2004).

2.4 Firefighters as Heroes or Victims

Although firefighters are commonly portrayed as heroic rescuers in the social culture in reality they are also victims of anti-social behaviour through responding to hoax calls, theft of equipment, obstruction of duties and verbal and physical attacks (Matheson et al, 2012). This constitutes a significant problem for the FRS as an organisation as well as for its personnel but there is little academic research in this area. Analysis of the British Crime Survey data revealed that personnel working in the protective service occupations such as the FRS are most at risk of experiencing violence at work (Webster, Patterson, Hoare, & O'Loughlin, 2007). Attacks on firefighters are both widespread and increasing and figures produced by the Fire Brigades Union suggest that there were 2,030 incidences of violence towards fire crews in 2005/2006, rising to 2,098 in 2006/2007 equating to 40 attacks per week and six attacks per day (Labour Research Department, 2008). Although the increase is not huge given the increase in the population of the UK over the same period it does suggest an upward trend. Recent statistics published by the Home Office in November 2017, revealed that within the last year attacks on firefighters had risen by 18.6%. If, however the public perception of the Fire and Rescue Service begins to change as they are seen to have close links to the Police as a result of the changes introduced by the Policing and Crime Act, 2017 (discussed further in section 2.6) it is possible that this problem may become even more severe. It is not uncommon for firefighters to face aggression and abuse because of

panic and thereby running the risk of emotional contagion with a knock on effect on risk taking and safety; however, research suggests that firefighters tend to regard this as a normal and expected part of their daily working lives (Brunsden, Hill, McTernan, & Shuttlewood, 2011). Panic aside; aggressive encounters with the public, whether physical, verbal or psychological can however, lead to personnel experiencing higher levels of stress and anxiety, which, in turn can result in detrimental health consequences for the individual and significant operational and economic costs to the FRS (Brunsden et al, 2011).

2.5 The Organisational Context of the Fire and Rescue Service

As part of their daily working lives firefighters are repeatedly exposed to traumatic events and therefore it is perhaps understandable that academics researching the FRS tend to focus on traumatic stress (Armstrong et al, 2014), despite the evidence suggesting that the majority of firefighters do not develop PTSD (Meyer et al, 2012). However, although it is an understudied area, there is some evidence to suggest that organizational stress is a particularly important predictor of mental health outcomes among firefighters (Meyer et al, 2012) actually predicting psychological strain to a similar extent as traumatic stress (Brough, 2004). One significant stressor has been the modernisation process (Brunsden et al, 2012) implemented over the last two decades, largely as a result of The Bain Report (2002), resulting in a move away from traditional fire brigades to the creation of the modern FRS with its new roles and changing culture (Matheson et al, 2011). Prior to this the UK FRS had traditionally operated within a strong para-military culture, predominantly white male dominated, rank structured and power based with a highly prescriptive discipline code and hierarchical leaders all of whom had been promoted from within the service (Archer, 1999).

Although there is some evidence, that modernisation has resulted in improvements in the performance of English Fire Authorities (Andrews, 2010), the process itself has generated a significant degree of resistance and unrest amongst FRS personnel nationwide (Thurnell-Read & Parker, 2009). These personnel have been sceptical of the newly implemented procedures and organizational restructuring feeling that the job has changed for the worst and often expressing nostalgia for the 'old days' (Ibid). Antagonism still exists between firefighters and the Government who seeks to implement these changes, as repercussions of these changes continue and issues such as pay, pensions and budget cuts continue to cause organizational stress. According to The Fire Brigades Union (2017), government cuts have resulted in the loss of over 11,000 frontline firefighters jobs in the UK since 2010, almost one-in-five, (19%) of the total firefighting force. Moreover, they claim that this is seriously undermining the FRS' ability to carry out their jobs effectively and is leading to slower response times. On top of this, firefighters, in line with other public sector workers, are being asked to increase their pension contributions to 13.2% of their salary, which, according to The Fire Brigades Union (2014) equates to one of the worst ratios between employer and employee. These stressors may be seen in other organizations but within the emergency services they take on additional significance as stressed and traumatised individuals may not perform their occupational role to the best of their ability and when

lives depend on that occupational role even small percentages of affected personnel constitute a serious risk to public safety (Brunsden et al, 2012).

2.6 Conclusion to the Chapter

This chapter has outlined the structure and the organisational culture of the Fire and Rescue Service together with the changing nature of the work being undertaken by Fire and Rescue personnel within the UK. Changes continue to be implemented which are likely to impact on the organisational context and culture of the Fire and Rescue Service. For example, the UK FRS has traditionally had a single tier entry system in which all operational staff begin their careers as firefighters following initial training. More recently, London FRS have just completed their first graduate entry scheme which fast tracks graduates into Station Manager roles. Another recent change involves the co-location of different emergency services in the same buildings, the aim of which is to reduce running costs therefore enabling funding to be targeted at frontline services, as well as making it easier to share knowledge and expertise. For example, in April 2016 The Welsh Ambulance Service and North Wales Fire and Rescue Service opened their joint purpose-built-resource centre in Wrexham, which houses eight fire appliances and six ambulances as well as a fleet workshop and training facilities. This approach is also being extended to personnel, for example, in February 2016 a pilot scheme in Devon has combined the roles of Police Community Support Officers (PCSO) and retained firefighters so that PCSO's carry pagers and respond to fire calls when on duty as PCSO's. In November 2016, a partnership between ambulance staff and firefighters was launched in Suffolk to trial co-responding at five fire stations across Suffolk. Under this scheme, firefighters will receive additional training and appliances will carry additional equipment in order that they can respond to cardiac arrest incidents alongside paramedics and community first responders.

However, perhaps the most radical change since this thesis began is the introduction of The Policing and Crime Act 2017, described by the Fire Brigades Union (FBU) as the "most significant change to the governance of the Fire and Rescue Service in generations" (Fire Brigades Union, 2017, p.1). This piece of legislation places all three emergency services under a statutory duty to collaborate where it improves efficiency or effectiveness and enables Police and Crime Commissioners (PCC's) to take over the running of Fire and Rescue Services in their area. Any PCC's wishing to take over a Fire and Rescue Service are required to consult locally and submit a business case to the Home Secretary, who can then grant the order, if it is considered to be in the interests of economy, efficiency, effectiveness or public safety.

The first ever Police, Fire and Crime Commissioner was recently announced by the Home Secretary, and the current Police and Crime Commissioner for Essex took up the expanded brief to include the control of Essex Fire and Rescue service from October 2017. This move has been opposed by the FBU who fear that this will lead to further frontline cuts and also put the independence and neutrality of the Fire and Rescue Service at Risk. The FBU argue

that it is vital that the Police and Fire and Rescue Service retain distinct and separate identities as firefighters offer a purely humanitarian, neutral and life-saving service but if they become identified with Law Enforcement their job could become more difficult. However, according to the FBU (2017) at least ten other PCC's have expressed an interest in taking over Fire and Rescue Services and at least one, Cambridgeshire, has submitted a business case and is awaiting a decision from the Home Secretary, which is due in December 2017. Thus, despite opposition it seems reasonable to speculate upon the strong likelihood that this will be the prevailing direction of travel for the Fire and Rescue Service.

The next chapter will review the existing literature on posttraumatic growth and the evidence for the existence of posttraumatic growth within Fire and Rescue Service Personnel.

Chapter Three: Review of Existing Literature on Posttraumatic Growth

3.1 Introduction to the Chapter

Nietzsche's (1889/1997) famous dictum 'what doesn't kill us makes us stronger' encapsulates the idea that adversity can lead to personal gain, an idea that is well documented throughout history in many literatures, philosophies and major religions such as Christianity, Hinduism and Judaism (Joseph & Linley, 2005). Several terms have been used to describe this phenomenon, such as perceived benefits (McMillen & Fisher, 1998), thriving (O'Leary & Ickovics, 1995) and stress–related growth (Park, Cohen, & Murch, 1996) but the most widely used term is posttraumatic growth, coined by Tedeschi and Calhoun (1995). Although these terms are often used interchangeably in the literature, differences in terminologies are based on factors such as levels of stress exposure, however, they all focus on perceptions of positive change following adversity (Cho & Park, 2013). Tedeschi and Calhoun (2004) argue that the term posttraumatic growth captures the essentials of this phenomenon better than these other terms in several different ways. Firstly, posttraumatic growth focuses more distinctly on the conditions of major crisis, rather than lower level stress, which might be suggested by stress-related growth and secondly, terms such as thriving may not reflect the fact that at times posttraumatic growth may co-exist with significant psychological distress (Tedeschi & Calhoun, 2004). Joseph and Linley (2006) assert that the term growth represents the deliberate use of a biological metaphor to describe an intrinsic actualizing process situated within a humanistic framework whereas other terms such as perceived benefits are being used atheoretically to describe subjective positive changes following trauma.

This thesis will use the definition of posttraumatic growth as "the experience of positive change that occurs as a result of the struggle with highly challenging life crises" (Tedeschi & Calhoun, 2004, p.1) as opposed to the result of any minor stresses or as part of a natural developmental process and in contrast to the construct of resilience which involves an individual returning to baseline functioning following engagement with a traumatic experience (O'Leary & Ickovics, 1995). A full discussion of relationship between resilience and posttraumatic growth is provided in section 3.6. Thus, posttraumatic growth is not just about learning to live with the effects of trauma, or bouncing back from trauma, but is instead likened to a springboard to further individual development and higher levels of psychological well-being (Tedeschi, Park, & Calhoun, 1998). Five main areas of growth have been identified: increased personal strength, identification of new possibilities, increased appreciation of life, improved relationships with others and positive spiritual changes (Tedeschi, Park & Calhoun, 1996:2004) and a review of 39 studies carried out by Linley and Joseph (2004) reported that typically 30-70 per cent of individuals who experience a traumatic event report positive changes in one or more of these areas.

Interest in this research area has grown considerably over the last decade fuelled by the emergence of positive psychology which has sought to more fully integrate the negative and positive aspects of human experience (Joseph & Linley, 2006) and it is now one of the flagship topics for positive psychology (Joseph & Butler, 2010). Posttraumatic growth has been observed in many and varied trauma exposed-populations including earthquake survivors (Vazquez, Cervellon, Perez-Sales, Vidales, & Gaborit, 2005), victims of rape and sexual abuse (Burt & Katz, 1987) and individuals involved in military combat (Aldwin, Levenson, & Spiro, 1994; Feder et al, 2008). The use of terms such as 'trauma', 'traumatic event', 'crisis' and 'highly stressful events' are used interchangeably as roughly synonymous expressions in this area of research (Tedeschi & Calhoun, 2004) and trauma has tended to be slightly more broadly defined and more inclusive than the restrictive definition put forward by the American Psychiatric Association (Zoellner & Maercker, 2006). Thus a lot of research into this phenomenon has also been carried out in the arena of health psychology using populations such as survivors of breast cancer (Weiss, 2002) and people living with HIV (Milam, 2004). Although developed within a Western cultural framework there is also accumulating cross-cultural research suggesting the occurrence of posttraumatic growth in many other cultures (Shakespeare-Finch & Copping, 2006; Dirik & Karanci, 2008; Taku, 2011). A full discussion of posttraumatic growth and culture is provided in section 3.10. Thus, this thesis will draw on literature from all of these areas and will use the term posttraumatic growth or growth throughout even though other authors may have used different terms to describe this phenomenon.

Vicarious posttraumatic growth
The phenomenon of vicarious posttraumatic growth, which refers to the development of these positive changes as a result of vicarious traumatic exposure, is now also well recognized (Arnold, Calhoun, Tedeschi, & Cann, 2005). The term vicarious traumatic exposure refers to indirect exposure to a traumatic event, for example, exposure to direct trauma survivors and/or adverse details of a traumatic event, rather than exposure to the traumatic event itself (Brockhouse, Msetfi, Cohen, & Joseph, 2011). There is a growing body of literature documenting vicarious posttraumatic growth in a variety of populations such as interpreters (Splevins, Cohen, Joseph, Murray, & Bowley, 2010), mental health workers (Hyatt-Burkhart, 2014) and members of the public (Linley, Joseph, Cooper, Harris, & Meyer, 2003). However, this research sought to focus on individuals who have direct exposure to trauma (and has excluded participants whose exposure is likely to be vicarious – see 7.4). Therefore, literature from this area will not be included but discussion of this is warranted to elucidate why this has been excluded.

3.2 Models of Growth

Introduction to models of growth
A number of models have been developed to capture the process of posttraumatic growth. For example, Nerken (1993) developed a model of growth related to the grieving process

which emphasises active grieving and shows how self-reflective activity and subsequent meaning making have central roles. However, the two main models of growth are the Transformational Model (Tedeschi & Calhoun, 2004) and Joseph and Linley's (2005) Organismic Valuing Theory. Central to both of these theories is the premise that experiencing traumatic events is not sufficient in itself to facilitate growth (Joseph & Linley, 2005), as posttraumatic growth arises from an individual's struggle to resolve their challenged assumptive world (Joseph, Murphy, & Regel 2012). Therefore, before discussing models of growth the following section will explore Janoff-Bulman's (1992) Shattered Assumption Theory as this provides a platform of understanding for the subsequent models of growth.

Janoff-Bulman's (1992) Theory of Shattered Assumptions
According to this theory, individuals have a set of fundamental assumptions, which form the bedrock of their understandings about themselves, and the world in which they live. The creation of these schemas begins in early childhood and is based on caregiver's responsiveness and dependability (Bowlby, 1969) and as individuals move towards adulthood, these schemas become increasingly resilient and resistant to change (Fiske, 2004). By the time adulthood is reached these schemas are so deeply embedded that they typically go unquestioned and unchallenged (Janoff-Bulman, 1992). In Western culture three fundamental assumptions are represented in such schemas; the world is a benevolent place, the world is meaningful, controllable, predictable and just, and as individuals, we are worthy decent people (Ibid). Such assumptions provide individuals with a sense of security and safety by allowing them to believe that misfortune can be prevented if they do the right things, engage in appropriately cautious behaviours and behave as decent people (Ibid). Although it is argued that these assumptions are acting at the deepest levels of the psyche they actually bear little resemblance to reality and are in fact nothing more than representations of the world (Ibid). The result of this is that individuals are psychologically unprepared (Janoff-Bulman, 1985) for engaging with traumatic events, which by their very definition are unexpected, unpredictable and uncontrollable (Joseph, 2012). Thus, when traumatic events are encountered the result is a shattering of these fundamental assumptions about the individual and their place in the world (Janoff-Bulman, 1992). Trauma survivors are forced to face the stark reality that they inhibit a world, which is risky, in which tragedy and misfortune do actually happen to good, careful people (Ibid). Trauma strips away the sense of safety and security that these fundamental assumptions once provided and now the task of the trauma survivor is to reconstruct a viable assumptive world view that encompasses the trauma related information without being defined wholly by anxiety and vulnerability (Janoff-Bulman, 2004).

Cann et al. (2010) suggested that the amount of posttraumatic growth reported is strongly related to the degree of challenge to an individual's assumptive world and empirical studies using both cross-sectional and longitudinal designs have supported this assumption. For example, research undertaken by Lindstrom, Cann, Calhoun, and Tedeschi (2013), using a

cross-sectional design, found that the challenge to one's assumptive world was the main predictor of posttraumatic growth in a sample of college students. Challenges to an individual's core belief serve as a departure point for eventual growth as they lead to the constructive cognitive efforts that are more likely to produce growth (Triplet, Tedeschi, Cann, Calhoun, & Reeve, 2012). Danhauer et al. (2013), using a longitudinal design investigated the role of core beliefs in the development of posttraumatic growth in a sample of adult leukemia patients and also found that a greater challenge to core beliefs was associated with higher posttraumatic growth scores. This has also received some cross-cultural support and Taku, Cann, Tedeschi, and Calhoun (2015) reported that the examination of core beliefs and posttraumatic growth were highly correlated in Japanese earthquake survivors. However, all these studies used the total scores on the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) whereas Taku and Oshio (2015) tested the role of core beliefs using an item level analysis of the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). Once again, findings suggested that the challenge to core beliefs is the critical factor in initiating the process of posttraumatic growth (Taku & Oshio, 2015).

It is however, worth noting that the degree to which core beliefs are examined is not necessarily equivalent to the perceived severity or stressfulness of the traumatic event (Taku, Cann, Tedeschi, & Calhoun, 2015) and only a weak to moderate correlation was reported between the perceived stressfulness of the event and the disruption of core beliefs (Lindstrom, Cann, Calhoun, & Tedeschi, 2013). The effect that an event has on an individual is ultimately subjective (Morris et al, 2005) and whilst some events may be quite stressful they do not necessarily challenge an individual's core beliefs about the world, without this initial challenge to core beliefs posttraumatic growth is unlikely to occur (Cann, Calhoun, Tedeschi, & Solomon, 2010).

Tedeschi and Calhoun's Model of Posttraumatic Growth
According to Tedeschi and Calhoun (1998), it is this struggle that the individual undergoes in reconstructing a viable assumptive world, that provides the potential for posttraumatic growth to occur and they use the metaphor of an earthquake to describe this growth process. Psychologically seismic events can severely shake, threaten or reduce to rubble many of the schemas that individuals use to guide understanding, decision-making and meaningfulness in their worlds (Tedeschi & Calhoun, 1998). Just as in the aftermath of an earthquake the community rebuilds physical structures to incorporate what they have learned about which structures have survived the shocks and which have not, the trauma survivors undertake cognitive processing and restructuring to produce new schemas which are more resistant to being shattered in the event of future shocks (Ibid). These new schemas allow individuals to make sense of what has happened to them and deal with their emotional reactions to the traumatic event (Joseph & Linley, 2005). Although Tedeschi and Calhoun's original model (1998) refers to the potentially 'seismic' impact of traumatic events their later research has suggested that highly stressful events at any level (referred

to as tremors in keeping with the earthquake metaphor) actually have the potential to lead to some degree of disruption of the assumptive world, consequent re-examination of one's core beliefs and thus, provide the potential for some posttraumatic growth to occur (Cann et al, 2010).

The model distinguishes between two types of repeated thinking about the event known as rumination: intrusive and deliberate rumination (Cann et al, 2010). In the initial aftermath of a traumatic event, individuals are likely to undertake cognitive processing that is automatic whilst also experiencing negative thoughts and images and negative intrusive rumination (Tedeschi & Calhoun, 2004). Viewed as a natural reaction to a traumatic event (Cann et al, 2010) and an indication that the event has had a significant impact on the survivor, (Taku, Cann, Tedeschi, & Calhoun, 2009) it is during this period that individuals attempt to comprehend what has happened to them as they try to come to terms with their new reality. For example, a parent who has lost a child must confront the reality that their child really did die (Triplet et al, 2012). This process can be a lengthy one with the individual experiencing high levels of distress but the existence of distress is important for the maximum amount of growth to occur as it signals the continuance of the cognitive processing directed towards rebuilding the pre-trauma schema (Tedeschi & Calhoun, 2004). A rapid resolution of this phase is probably indicative that the individual's assumptive world has not been severely tested, and thus the trauma related information has been relatively easily accommodated; in such cases, growth will not occur (Ibid). Conversely, if intrusive rumination persists this may be reflective of the fact that the survivor has unresolved issues regarding the traumatic event, they have not been able to successfully rebuild their assumptive world and this may be predictive of continued high levels of psychological distress (Taku et al, 2009).

The individual's social system and self-disclosure also play an important part in the growth process described in this model as these can facilitate cognitive processing and thus the revision of schemas thereby encouraging growth (Tedeschi & Calhoun, 2004). Social support networks provide the trauma survivor with sources of comfort and relief as well as providing new perspectives on what has happened that can assist them in the construction of their new post-trauma schemas (Ibid). Particular emphasis is placed on mutual support as trauma survivors tend to give credibility to individuals who have undergone similar experiences; for example Cobb, Tedeschi, Calhoun, and Cann (2006), using a sample of women who had undergone intimate partner violence, reported that knowing someone who had had a similar experience and had experienced growth facilitated growth. It appears that having relevant models of posttraumatic growth in one's social network might facilitate recognition and appreciation of the positive benefits of a traumatic experience (Cobb et al, 2006). Thus, having a role model can be crucial in determining the degree of willingness individuals have to take on board new perspectives (Tedeschi & Calhoun, 1993).

However, Wortman (2004) critiques this aspect of the model arguing that Tedeschi and Calhoun (2004) are far too optimistic in assuming that others will respond to self-disclosures with empathy and concern when in fact most people are uncomfortable with trauma survivors' displays of distress because of the feelings of helplessness they elicit and therefore actively attempt to discourage them. Moreover, she argues that in most cases people do not respond positively to attempts by others to provide fresh perspectives on what has happened and thus, rather than facilitating survivors' cognitive processing about the event and subsequent growth, social interactions can actually often impede growth (Wortman, 2004). However, more recently, a study by Slavin-Spenny, Cohen, Oberleitner, and Lumley (2011) investigated the impact of self-disclosure on levels of posttraumatic growth by assigning participants, who had experienced a traumatic event, to one of four disclosure conditions. The first was active facilitator in which participants spoke to a facilitating therapist; the second passive listener in which the therapist was empathetic but passive; in the third condition participants were alone and spoke into a tape recorder and in the fourth condition participants wrote about their experiences. Participants in all four conditions reported higher levels of posttraumatic growth than controls, which the authors interpreted as meaning that it is the self-disclosure itself that is important rather than the response of others. They concluded from their results that a single session of self-disclosure can lead to posttraumatic growth (Slavin-Spenny, Cohen, Oberleitner, & Lumley, 2011).

Over time as individuals institute successful coping, ruminative activity becomes less automatic and more deliberate, reflective and focused on making sense of events (Martin & Tesser, 1996). It is this phase of cognitive processing that is crucial to growth outcomes (Taku et al, 2009) as it involves the disengagement from previous goals that are no longer attainable, beliefs that are no longer tenable, together with the creation of new life narratives (Tedeschi & Calhoun, 2004). Although the model suggests a movement from one style of ruminative activity to another, Calhoun and Tedeschi (2010) acknowledge that in reality it is likely that the two styles co-exist or may oscillate (Stroebe & Schut, 1999) for a period of time until the frequency of intrusive thoughts is reduced as the deliberate rumination provides a reconstructed world view and allows the individual to find meaning in the traumatic experience. Many trauma survivors search for meaning in their experiences following the traumatic event and those who engage in purposeful cognitive processing of the event may be more likely to find the meaning that helps reaffirm or rebuild the challenged assumptive world (Groleau, Calhoun, Cann, & Tedeschi, 2013). For example, Park, Edmondson, Fenster, and Blank (2008), using a sample of 172 cancer patients, found that the presence of meaning in life was positively correlated with posttraumatic growth. The possibility of enduring distress does still exist in this phase although it is likely to exist at lower levels than in the immediate aftermath of the traumatic event (Joseph & Linley, 2006). In this model, growth is viewed as both a process and an outcome and is accompanied by the development of a sense of wisdom about the world (Webster & Deng,

2015) and potentially in the long term a greater satisfaction with life (Tedeschi & Calhoun, 2004).

This resulting growth has been divided into three broad categories; changes in the perception of self, changes in the experience of relationships with others and changes in one's philosophy of life (Tedeschi & Calhoun, 1995). Within these categories factor analysis has revealed five domains of growth; personal strength, new possibilities, relating to others, appreciation of life and spiritual changes (Tedeschi & Calhoun, 1996). Changes in perception of self includes increases in personal strength and the identification of new possibilities; changes in the experiences of relationships with others consists of relating to others and lastly changes in philosophy of life includes an increased appreciation of life and changes in spiritual/religious beliefs (Taku, Cann, Calhoun, & Tedeschi , 2008). The nature and validity of these categories will now be explored.

Personal Strength
Tedeschi and Calhoun (2013) summarise the paradox of growth with the phrase 'more vulnerable yet stronger'. Although encountering traumatic events can remind individuals of their own vulnerability, dealing with such events leads some individuals to realise that within themselves they have abilities to cope and survive which they never previously knew existed (Ibid). Thus, a common theme expressed by trauma survivors is that they are stronger than they thought they were and much more capable of handling a crisis than they were before (Carnelley, Wortman, Bolger, & Burke, 2006). According to Tedeschi and Calhoun (2004) growth in the domain of personal strength is experienced as a combination of the knowledge that bad things can and do happen to good people and the discovery that if they can handle this traumatic event they can handle just about anything else.

New possibilities
New possibilities relates to the experience of new options that were not previously considered and can include the discovery of a new and different path in life (Lindstrom et al, 2013). Examining posttraumatic growth following bereavement Calhoun, Tedeschi, Cann, and Hanks (2010) posit that the bereaved may need to take over relationship connections and responsibilities previously undertaken by the deceased thus opening themselves up to new experiences. Although not suggesting that the deceased individual can be directly replaced, loss also introduces the possibility of new relationships and opens the door for new people to enter the bereaved person's life (Calhoun, Tedeschi, Cann, & Hanks, 2010).

Relating to others
As much as life crisis can often put a strain on and test relationships, they can also offer the potential for deepening and strengthening relationships (Joseph, 2012). An increased sense of closeness with others has been reported by trauma survivors, which is often expressed about significant personal others, such as close friends or family members (Calhoun et al, 2010). It is also not uncommon for trauma survivors to report a greater sense of freedom to talk about feelings and emotions with trusted others but also to let them see their feelings

and emotions (Calhoun & Tedeschi, 2013). Encountering traumatic events can lead individuals to be more honest about how they think and feel (at least to trusted others) and more at ease with expressing themselves emotionally to others (Ibid). Individuals may also exhibit an increased compassion for other human beings, particularly those who are suffering (Bauwens & Tosone, 2010).

Increased appreciation of life

One of the most common growth experiences however, is an increased appreciation of life as trauma can teach people that many of the things they love can be transient and therefore they should enjoy them while they can (Calhoun & Tedeschi, 2013). This may be particularly the case with traumatic events that involve strong reminders of mortality such as a diagnosis of cancer or experiencing an earthquake (Ibid). The majority of survivors of a shipping disaster indicated that they no longer took life for granted and 75% reported that henceforth they made it a priority to live each day to the fullest (Joseph, Williams, & Yule 1993). This could be a particularly salient domain of growth for Fire and Rescue Service personnel as many of the traumatic incidents they deal with involve death or serious injury (Moffitt, Bostock, & Cave, 2014). This new appreciation of how precious life is can lead to a revision of life priorities (Lindstrom et al, 2013) and typically this change in priorities attributes an increased importance to what may have previously been viewed as the small things in life (Tedeschi & Calhoun, 2004).

Spiritual changes
Spiritual changes have been identified as the fifth domain of growth and there is some evidence that individuals who are religious find a deepening of their faith following an encounter with trauma (Butler et al, 2005). It is possible that religion aids in fostering social support or alternatively helps to provide individuals with a sense of meaning both of which, have been implicated, in the development of posttraumatic growth (Shaw, Joseph, & Linley, 2005). However, growth in this domain can also be experienced by individuals who are not religious, or even actively atheistic as experiencing growth in this domain relates to becoming more aware of spiritual matters and being more likely to engage with the fundamental existential questions of meaning in life (Calhoun & Tedeschi, 2013).

Critics have argued that The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is severely lacking in its assessment of the spiritual domain as two items (one focusing on religiosity and one on spiritual understanding) are insufficient to capture spiritual or religious change (O'Rourke, Tallman, & Altmaier, 2008). Consequently, there have been calls for greater sophistication in the measurement of this domain (Shaw et al, 2005). Furthermore, it has been suggested that the spiritual domain reflects the importance of religion and personal spirituality within the American culture where the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) was developed, this may not necessarily be the case in other European countries or other cultures (Pals & McAdams, 2004). A full

discussion of the importance of culture in the experience of posttraumatic growth is provided in section 3.10.

In order to address these criticisms Tedeschi, Cann, Taku, Senol-Durak, and Calhoun (2017) have recently developed the Posttraumatic Growth Inventory-X (PTGI-X) which retains the original two items in the spiritual change domain but includes an additional four items. Tedeschi et al. (2017) argue that the addition of these items allows individuals to report changes in a broader spiritual and existential domain and captures posttraumatic growth experienced by non-religious individuals whose spiritual and existential beliefs formed an important part of their post-trauma experience. These individuals are more likely to be living in cultures that are more secular or have fewer adherents to traditional religions (Tedeschi, Cann, Taku, Senol-Durak, & Calhoun, 2017).

Critique of model
Pals and McAdams (2004) argue that the assessment of posttraumatic growth should not be constrained by these preconceived ideas as to what constitutes growth as it is possible that an individual may experience growth in a way that does not fit into one of these five domains. Calhoun and Tedeschi (2013) do acknowledge that no general summary can include every possible way in which every individual will experience growth, however, they assert that the way in which these five domains are reported does appear to suggest a commonality of experience (Calhoun & Tedeschi, 2013).

According to McMillen (2004), the major limitation of this model lies in its generic nature as the same processes are proposed to lead to growth in each of the five domains. He argues that, in reality, it is likely that different processes are involved in different domains and therefore it may be more fruitful to develop models for each of the five domains and then determine the processes the different models share. Within the domain of improved relationships, for example, McMillan (2004) argues that factors such as family functioning prior to the trauma, changed behaviour on the part of family members other than the trauma survivor, degree to which there is increased communication and increased proximity amongst family members following the trauma and the trauma survivors recognition of these changes in others are all factors that could help explain posttraumatic growth but are not included in Tedeschi and Calhoun's (2004) model.

Organismic Valuing Theory of Growth
Joseph and Linley (2006) suggest that although a seismic shattering of the assumptive world can be a precursor to growth a more gradual breakdown and rebuilding of the assumptive world can also lead to growth. Thus, the Organismic Valuing Theory of Growth (Joseph & Linley, 2005) is a generic theory of personal growth, which can be applied to all experiences that are incongruent with some facet of self-structure. Whilst they acknowledge that Tedeschi and Calhoun (2004) offer a coherent explanation of the mechanism and processes involved in growth they also argue that the model is descriptive rather than explanatory (Joseph & Linley 2006) failing to address the question of why individuals are motivated to

move towards growth. Moreover, they assert that any model lacking this explanation is merely a static one, which fails to account for the active and dynamic nature of the growth process (Joseph & Linley, 2005). The Organismic Valuing Theory of Growth builds on previous models of growth and addresses this limitation by explaining this motivation in terms of the organismic valuing process (Ibid). Central to this theory is that human beings are active growth-orientated organisms that are naturally inclined to integrate their psychological experiences into a unified sense of self and integrate themselves into larger social groups and structures (Ibid). The organismic valuing process refers to the innate tendency within each individual to know their best direction in life in their pursuit of fulfilment and well-being (Ibid). The extent to which an individual acts in accordance with this process can, however, be affected by their social environment but individuals guided by this process experience greater satisfaction of their innate psychological needs, greater fulfilment and well-being (Ibid).

Thus when an individual's assumptive world is shattered following an encounter with trauma they experience the need to integrate the new trauma related information, they call this the completion tendency and it is viewed as being part of the organismic valuing process (Joseph & Linley, 2005). According to this theory, people are intrinsically motivated towards processing this new information in ways that maximise their psychological well-being (Ibid). However, attempts to positively accommodate this trauma related information into individual's mental models tend to lead to intrusive and avoidant states, which are characteristics of PTSD (Ibid). These states signal the need to cognitively and emotionally process the new information and typically individuals oscillate between the two (Horowitz, 1976). However, rather than indicating the development of psychopathology these states indicate that individuals are 'working through' the implications of engaging with the traumatic event and it is these implications that could lead to growth (Helgeson, Reynolds, & Tomich, 2006). This is a challenging period for the individual though and requires a supportive social environment in order for the trauma related information to be positively accommodated into new mental models (Joseph & Linley, 2005). The model does however acknowledge that well-meaning others can be unhelpful in their attempts to provide support, as they may be perceived to react to survivor's disclosures with dismissal, incredulity or hostility (Harvey, Barnett, & Overstreet, 2004).

The implication of Organismic Valuing Theory therefore, is that posttraumatic stress is the catalyst for posttraumatic growth (Joseph, 2012). Further support for this view is provided by a meta-analytic review of 87 studies conducted by Helgeson, Reynolds, and Tomich (2006) who concluded that greater posttraumatic growth was related to more intrusive and avoidant thoughts. A similar conclusion was reached by a more recent longitudinal study using a sample of Israeli ex-prisoners of war over a 17 year period; greater posttraumatic stress in 1991 predicted greater growth in 2003 and greater posttraumatic stress in 2003 predicted greater growth in 2008 (Dekel, Ein-Dor, & Solomon, 2012).

This model also makes a distinction between psychological well-being (referred to as the eudaimonic perspective) and subjective well-being (referred to as the hedonic perspective) and reframes posttraumatic growth as an increase in psychological well-being (Joseph & Linley, 2005). Subjective well-being refers to an individual's general affective states coupled with life satisfaction (Keyes, shmotkin, & Ryff, 2002) whereas psychological well-being refers to existential engagement with life, purpose, autonomy and mastery (Durkin & Joseph, 2009). As the concept of posttraumatic growth is derived from the eudaimonic tradition (Keynes et al, 2002) it conceptually aligns more closely with psychological well-being. Thus, it is possible that an individual may be sadder as a result of a traumatic event, but yet have an increased appreciation of life and live their lives more meaningfully (Joseph & Linley, 2005). This theoretical reframing is important because clinical psychology has traditionally been concerned with the alleviation of distress, i.e. raising an individual's subjective well-being but an alternative agenda for therapists is advocated by this model which might sometimes be to raise an individual's psychological well-being and in doing so over time indirectly foster their subjective well-being (Ibid).

The possibility of a curvilinear relationship between posttraumatic stress and posttraumatic growth

There is some evidence to suggest that the relationship between posttraumatic growth and posttraumatic stress is a function of the intensity of posttraumatic stress. For example, a large scale longitudinal study carried out by Butler et al. (2005) following the terrorist attacks of 09/11/2001 in the USA found that greater posttraumatic stress was associated with greater posttraumatic growth, but only up to a point above which posttraumatic growth declines. This curvilinear relationship between posttraumatic stress and posttraumatic growth has also been reported in other studies. For example, McCaslin, et al. (2009) found that the greatest posttraumatic growth was associated with moderate levels of posttraumatic stress symptoms in 93 university students. Kunst (2010) found this curvilinear relationship in 678 victims of violence as did Kleim and Ehlers (2009) in two groups of 180 and 70 assault survivors respectively. However, these findings need to be considered alongside some of the limitations inherent in these studies. For example, although Kleim and Ehlers (2009) used two large samples, growth scores were low across both groups and all participants were survivors of physical assault, which may prevent generalisation of the results to other traumas. Similarly, the sample used by Kunst (2010) also consisted of survivors of severe violence. Whilst participants in the McCaslin et al. (2009) study had experienced a more diverse range of traumatic events, they were a convenience sample of medical students and represented a select group of young, highly educated people from middle class or above families. Furthermore, the study was undertaken in Sri Lanka but no attempts were made to adapt the measures of distress and growth that were used to reflect the cultural and psychological contexts of that country (McCaslin et al, 2009).

However, evidence of this inverted U shaped relationship between posttraumatic stress and posttraumatic growth has been found not only in single studies but also meta-analyses,

which included 42 studies and a wide variety of trauma types (Shakespeare-Finch & Lurie-Beck, 2014). An individual experiencing low levels of post-traumatic stress reactions has been minimally affected by their exposure to a traumatic event, and therefore, one would expect them to experience minimal posttraumatic growth (Joseph, 2012). An individual experiencing moderate levels of posttraumatic reactions, has had their assumptive world challenged triggering the intrusive and avoidant symptoms, but they are still able to function and engage in the necessary affective-cognitive processing required to make meaning of their experiences (Joseph, 2012). However, an individual who is experiencing a high level of posttraumatic stress is likely to be experiencing some degree of impairment to their coping ability and their ability to cognitively process and work through their experiences are impeded (Ibid).

The two models presented thus far represent complimentary rather than competing theories offering different levels of explanation; Tedeschi and Calhoun's (2004) model providing an understanding of the social and psychological factors relating to growth with the Organismic Valuing Theory of growth providing "a meta-theoretical underpinning that provides explanatory power" (Joseph & Linley, 2006,p.1047).

Action focused model of growth
More recently, Hobfoll et al. (2007) have proposed an action focused model of growth, which posits that actual growth, as opposed to perceived growth, is only realised when cognitive reframing subsequently translates to behavioural changes. This model is based on Conservation of Resources Theory (Hobfoll, 1988), which suggests that individuals strive to acquire, maintain and protect valued resources which fall into the domains of personal, characteristic, condition, energy and object resources and psychological distress is caused when they are threatened or lost (Hobfoll et al, 2007). Thus in this model the high level of distress that an individual experiences following a traumatic event is a result of the significant challenge posed to the individual's psychosocial resources, such as health, self-esteem and social support networks (Ibid). Whilst acknowledging that individuals frequently report growth following trauma they argue that such reports represent meanings that are often shallow and fleeting (Ibid). Thus, posttraumatic growth does not occur just from cognitive attempts at meaning making and re-structuring fundamental assumptions about the world but for 'true' growth to occur it must lead to actual changes, which are sustained once the trauma period has passed, and which in turn will lead to the reduction in psychological distress (Ibid).

Although some researchers have welcomed this move away from the overvaluation of cognitive processing that dominates other models of growth (Westphal & Bonanno, 2007) this model has been critiqued on a number of grounds. Firstly, methodological concerns include the fact that the model is based on rather limited research with 190 settlers from Gaza (Pat-Horenczyk & Brom, 2007), a sample who remain in a dangerous setting and therefore are not yet in a position to reflect on the aftermath of trauma as this is still

ongoing (Tedeschi, Calhoun, & Cann, 2007). Secondly, the model fails to account for the many situations in which action may be neither feasible nor warranted, for example when there are no opportunities for redressing past injustices and more internal, cognitive forms of coping could protect an individual from feelings of demoralisation and frustration which could result from forced inaction (Westphal & Bonanno, 2007).

Furthermore, it has been suggested that this notion of action- focused growth may unnecessarily narrow the concept of posttraumatic growth (Westphal & Bonanno, 2007). For example, a study of breast cancer survivors carried out by Frazier and Kaler (2006) found that whilst participants reported higher levels of empathy following their illness this did not lead to them spending more time volunteering and another study using cancer survivors reported an increase in participants concern for the next generation but not in generative actions (Bellizzi, 2004). Therefore, Wagner, Forstmeier, and Maercker (2007) argue that such results question Hobfoll et al. (2007) assumption that action is a necessary precursor to or correlate of posttraumatic growth.

Although this model is restricted by lack of robust evidence, it is possible that there are emotional, social and behavioural components to posttraumatic growth, which are largely neglected by the cognitive models (Wagner, Forstmeier, & Maercker, 2007). Further research, using a less specific sample and a longitudinal design, is needed to investigate whether individuals who report posttraumatic growth intentions also translate those intentions into actions and whether this leads to positive health outcomes (Ibid).

Originally, research in this area focused on the occurrence and prevalence of posttraumatic growth but more recently the focus has moved to investigating which factors are linked to growth and why the experience of growth varies between individuals (Lindstrom et al, 2013). Thus, the various variables that have been associated with growth within the literature will now be reviewed.

3.3 Posttraumatic Growth and Personality
Tedeschi and Calhoun (1996) investigated the relationship between personality variables and growth in their original validation of the Posttraumatic Growth Inventory using the Five Factor model of personality developed by Costa and McCrae (1992). According to this model personality traits can be summarised in terms of five factors; extraversion, openness to experience, agreeableness, conscientiousness and neuroticism (Costa & McCrae, 1992). A sample of over 600 students completed the NEO Personality Inventory (Costa & McCrae, 1985), chosen because it was believed to be a comprehensive and well-validated measure of the Big Five personality factors, and results suggested that extraversion, openness to experience, agreeableness and conscientiousness were all positively correlated with posttraumatic growth whereas neuroticism was negatively correlated (Tedeschi & Calhoun 1996). However, posttraumatic growth was most consistently associated with the traits of

extraversion and openness to experience with extraversion being significantly associated with all the five factors of the Posttraumatic Growth Inventory (correlating most strongly with the factor of improved relationships) and openness to experience being associated with new possibilities and personal strength (Ibid).

Openness is defined as the tendency to be interested in new situations, new ideas and new experiences (Zoellner et al, 2008) and people who are high in openness are believed to be imaginative, creative, emotionally responsive and intellectually curious (Costa & McCrae, 1985). These individuals have the ability to effectively manage the uncertainty of life, to acknowledge that change is constant and to develop rather than work against this change. Therefore, it is likely that they are more able to deal with traumatic events and the life changes that often accompany these (Zoellner et al, 2008). If cognitive processes are crucial for the development of growth (Tedeschi & Calhoun, 2004) then open minded individuals should be more willing to engage in deliberate rumination about the impact of the traumatic event on their lives (Zoellner et al, 2011).

Extraversion is proposed to be the major five factor model correlate of positive affect (Shakespeare-Finch et al, 2005) and the dimension underlying a broad group of traits, including sociability, activity and the tendency to experience positive emotions such as joy and pleasure (Costa & McCrae, 1992). In contrast, neuroticism represents the individual's tendency to experience psychological distress (Ibid). Although the literature in this area is relatively sparse, there are a number of studies, which have replicated Tedeschi and Calhoun's (1996) findings. For example, Sheikh (2004) used a sample of individuals from both the UK and the USA with a history of heart disease to explore the relationship between personality, coping and growth, found that the trait of extraversion was the most consistent and significant predictor of posttraumatic growth whereas there was no relationship between neuroticism and growth. Garnefski, Kraaij, Schroevers, and Somsen (2008) replicated these findings with regard to extraversion but in a similar sample, 139 patients who had experienced a myocardial infarction, which could perhaps give rise to the suggestion that this may be specific to this population. However, Linley and Joseph (2004), in a review of 39 studies of varying trauma exposed populations, also found a positive association between extraversion and growth and a negative association between neuroticism and growth whereas a meta-analysis by Helgeson, Reynolds, and Tomich (2006) concluded that neuroticism was unrelated to growth. Thus, in general, research appears to support the role of some personality traits in shaping posttraumatic growth (Karanci et al, 2012). However, given the absence of consistent findings in the literature to date, the relationship between personality and posttraumatic growth is one that requires further investigation, which this thesis seeks to do.

Tedeschi and Calhoun (1996) suggested that extraverts are more likely to tolerate increased stimulation and perhaps they are also more likely to express their emotions and disclose them to others, which may promote posttraumatic growth in interpersonal interactions (Jia

41

et al, 2015). Thus, whilst some evidence suggests that personality variables have a direct effect on posttraumatic growth (Jia et al, 2015) it has also been suggested that personality has an indirect effect on posttraumatic growth, and is mediated through various coping processes (Tedeshi & Calhoun, 1998). For example, problem focused coping was found to mediate the relationship between extraversion and growth in a study carried out by Sheikh (2004). Tedeschi and Calhoun (1996) suggest that extraverts are more likely to use social support and in line with this in Jia et al. (2015) study of posttraumatic growth in survivors of the Wenchuan Earthquake found that social support mediated the relationship between extraversion and posttraumatic growth. This may reflect the extraverted individual's ability to create a supportive environment and mobilise different support systems during traumatic experiences (Jia et al, 2015) both of which could foster posttraumatic growth (Tedeschi & Calhoun, 2004). However, another possible explanation could be that extraverts may have more optimistic traits (Jia et al, 2015).

Posttraumatic growth and optimism
Tedeschi and Calhoun (1996) also found a positive association between optimism and posttraumatic growth. Optimism is defined as a self- reported general expectancy of good things to happen more often relative to bad things (Scheier, Carver, & Bridges, 1994). Prati and Pietrantoni (2009) state that there are three reasons why optimists may experience higher levels of posttraumatic growth. Firstly, optimists might be more inclined to derive a sense of benefit from adversity than pessimists (Tennen & Affleck, 1998). Secondly, optimists are more inclined to flexibly employ adaptive coping strategies rather than rigid patterns of coping (Solberg & Segerstrom, 2006), they use more problem focused coping in controllable situations and make more use of reframing and acceptance coping in uncontrollable situations (Scheier et al, 2001). Lastly, optimism is considered a predictor of perceived capability to manage the demands of a potentially traumatic event (Benight & Bandura, 2004). According to Tedeschi and Calhoun (2004) however, optimism may be related to posttraumatic growth through the influence it has on cognitive processing; optimists may be more able to concentrate on the most important matters and disengage from unachievable goals or from world views that are inconsistent with the post trauma reality and this in turn leads to the cognitive processing that is crucial for growth to occur. Conversely, Zoellner et al. (2008) argue that because optimists are self-reported positive thinkers they may feel the need to report that they have grown from their experiences irrespective of whether they truly have and thus optimism represents the illusory, self-deceptive or dysfunctional side of posttraumatic growth that they present in their two component Janus-Face model of growth. In this model the perception of growth by trauma survivors who are still emotionally distressed, is thought to be largely illusory, serving a self-palliative function to counterbalance negative emotions (Maercker & Zoellner, 2004).

Other studies examining the relationship between optimism and posttraumatic growth, however, have also shown a small to moderate correlation (Curbow, Somerfield, Baker, Wingard, & Legro, 1983; Park, Cohen, & Murch, 1996). Furthermore, similar results have

also been derived from more recent meta-analysis; Helgeson et al. (2006) looking at the results of 87 studies found a moderate effect size for optimism as did Prati and Pietrantoni (2009) with a larger sample of 103 studies. There is some suggestion that results from the early studies linking optimism and growth were confounded because the original version of the Life Orientation Test (LOT; Scheier & Carver, 1985), which was used to measure optimism, contained two items which appeared to measure the ability to extract positive value from negative events (Jayawickreme & Blackie, 2014). However, Prati and Pietrantoni (2009) found no significant differences in the effect sizes when the original version of the LOT was used (Scheier & Carver, 1985) as opposed to the revised Life Orientation Test (LOT-R; Scheier et al, 1994) which had the two items removed thus suggesting that the instrument used did not affect the relation of optimism to growth.

The relationship between personality and posttraumatic growth is an important relationship to examine as findings will allow interventions that promote growth to be directed at personal resources such as personality traits (Sheikh, 2004). Although personality traits such as extraversion are generally thought to be enduring and stable dispositions and as such are relatively resistant to change, interventions can be aimed at promoting attitudes, expectancies and behaviours that are most similar to this particular personality trait (Ibid). Fleeson, Malanos, and Achille (2002) found evidence of a relationship between extraversion and positive affect and simply by acting extraverted resulted in individuals experiencing positive feelings and an increased sense of well-being. Thus, if extraversion and optimism are found to be predictors of growth, interventions could be designed to promote growth by helping individuals change self-defeating expectancies into positive expectancies and optimism (Sheikh, 2004).

3.4 Sex Differences in Posttraumatic Growth
There is some evidence to suggest sex differences in the degree to which men and women report posttraumatic growth. Tedeschi and Calhoun (1996) study found significant sex differences in posttraumatic growth amongst university students with women reporting higher levels of posttraumatic growth than men. Although less of a difference was found in the domains of new possibilities and personal strength females were still more likely to perceive these changes than males (Tedeschi & Calhoun, 1996). Sex differences have also been found amongst a diverse range of trauma exposed populations such as survivors of cancer (Bellizzi, 2004), HIV patients (Milam, 2004) and more recently earthquake survivors (Jin, Xu, & Liu, 2014). Conversely, however, there are also studies that did not support these sex differences; for example, Polatinsky and Esprey (2000) reported no sex differences in posttraumatic growth between parents bereaved of a child. However, this study used a sample of 67 adults which represents a much smaller sample size than the other studies (Linley & Joseph, 2004) and both males and females in this study were already involved in a social support network (Polatinsky & Esprey, 2000) which is considered an important factor in the facilitation of growth (Tedeschi & Calhoun, 2004). The largest meta-analysis undertaken to date to confirm the direction and magnitude of sex differences in

posttraumatic growth examined 70 studies and found a small to moderate sex difference with women again reporting more posttraumatic growth than men (Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010).

These sex differences have also been replicated in research using emergency service workers; Shakespeare-Finch et al. (2005) using a large sample of operational ambulance personnel reported that female officers scored higher on the posttraumatic growth inventory than their male counterparts. However, they offered no explanation for these differences. To date there has been very little research undertaken to examine the potential underlying processes that may lead to these sex differences but it has been suggested that the tendency for women to engage in more rumination than men may be one possible mediator (Shakespeare-Finch et al, 2005). Tendencies to ruminate on constructive issues such as an appreciation of the importance of social connections or an increased awareness of personal strengths has been viewed as one of the mechanisms leading to greater posttraumatic growth (Tedeshi & Calhoun, 2004). Secondly, it has been suggested that coping styles are a potential mediator in processing traumatic events with posttraumatic growth being related to emotion-focused coping styles (Helgeson et al, 2006). If women are more likely to use more emotion-focused coping styles as some research suggests (Vingerhoets & Van Heck, 1990) then they are engaging in a process that is related to core mechanisms proposed to be operating in the posttraumatic experience (Vishnevsky et al, 2010).

The existence of contradictory findings suggest that more work needs to be undertaken to further our understanding of these sex differences in order to inform current models of posttraumatic growth. In recognition of this, additional efforts were made to contact female firefighters directly and organisations that represent female firefighters (see 7.2) in order to obtain a sufficient number of female participants to make the examination of potential sex differences viable in the current programme of research.

According to Home Office (2016) statistics, only 5% of firefighters in England are female and although this is steadily increasing the likelihood is that there will be significantly more males than females in the UK Fire and Rescue Service for the foreseeable future. Thus, potentially this population will experience lower levels of growth than may be possible and therefore, understanding whether females experience more posttraumatic growth and the reasons behind this becomes increasingly important. If coping styles are partially responsible for these differences, as has been suggested, (Helgeson et al, 2016) then this knowledge could be used to develop interventions which could enable male and female firefighters alike maximise their potential to experience positive benefits from their work.

3.5 Posttraumatic Growth and Age
The relationship between age and posttraumatic growth has also attracted considerable interest from researchers within this area. Original research by Tedeschi and Calhoun (1996) reported no effect of age on posttraumatic growth. However, as the sample used was a

student one, the age range of participants was fairly limited, only 17 to 25. Nevertheless, similar results have been reported in other studies. Collins, Taylor, and Skokan (1990) using a sample of cancer patients with an age range of 30 to 66 reported that there was no effect of age on posttraumatic growth as did Lehman et al. (1993) using a sample of bereaved spouses and parents. However, both of these studies had relatively small sample sizes, 55 and 94 participants respectively.

Subsequent research undertaken by Tedeschi and Calhoun (2004) suggested that more growth is likely to be reported by younger people due to them being more open to learning and change rather than much older people who may have already learned their life lessons. Contemporary research has consistently replicated these results using a variety of samples and age ranges. For example, Powell, Rosner, Butollo, Tedeschi, and Calhoun (2003) reported a strong age effect, with younger people reporting more posttraumatic growth, in a study with former refugees, ranging in age from 16 to 65. Also Xu and Liao (2011) using a sample of over 2,000 earthquake survivors ranging in age from 18 to 68 reported that a younger age was a predictor of posttraumatic growth. Furthermore, a review of the literature carried out by Linley and Joseph (2004), examined 39 studies with differing populations and traumatic events and also concluded that younger people were generally more likely to report posttraumatic growth once a given level of developmental maturation was reached. Davis, Holen-Hoeksema, and Larson (1998) suggest that older individuals are less likely to report growth because the temporal proximity of their own death may mean that this is their focus. Alternatively, it has been suggested that a younger population may experience more posttraumatic growth than a middle aged to older population, because proportionately younger individuals have fewer years against which to evaluate critical life experiences (Sheikh and Marotta, 2005). The question of the effect of age on posttraumatic growth is a particularly salient one at the current time as Government statistics published in July 2017 confirmed that the UK has an aging population, 18% of individuals living in the UK were over 65 in 2016 (Office of National Statistics, 2017). If older cohorts are less likely to make significant and adaptive changes (Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003) then this has important implications for the UK population, which makes this an important relationship to examine within the current programme of research.

However, these age differences were not replicated in research conducted with emergency services personnel. Oginska-Bulik and Kobylarczyk (2015) investigating posttraumatic growth in a group of Polish paramedics divided the sample into two groups, below 36 years and 36 years and over, and reported no statistical differences in the two groups in overall scores on the posttraumatic growth inventory or any of the five factors of growth. It may be, however, that this was a result of dividing the sample into only two groups and as there is evidence of cultural differences in the experiences of posttraumatic growth (Taku, 2013) there is no way of knowing if these findings would replicate in UK emergency services personnel.

This debate takes on particular relevance in relation to the UK Fire and Rescue Service, however, as age figures (in bands) were published for the first time in March 2016 as part of Government statistics on workforce diversity. 73% of firefighters in England in 2016 were aged 36 or older, whilst 38% of firefighters were aged 46 and over and the number of firefighters in the three youngest bands (16-24, 25-35, 36-45) had all decreased every year between 2011 and 2016. Low levels of recruitment means that it is unlikely that the number of firefighters in the younger bands will significantly increase in the near future. Thus, if posttraumatic growth is more likely to be experienced by younger people (Tedeschi & Calhoun, 2004), this could have important implications for this population in perceiving the positive benefits from the work that they undertake and therefore is an important area to examine in this thesis.

3.6 Posttraumatic Growth and Resilience

There is some degree of theoretical confusion in the literature regarding the constructs of Posttraumatic growth and resilience (Tedeschi et al, 2007). For example, some researchers argue that posttraumatic growth is a particular form of resilience (Lepore & Revenson, 2006) whilst others debate whether growth outcomes are superior to resilience (Johnson et al, 2007; Tedeschi et al, 2007; Westphal & Bonanno, 2007). Lepore and Revenson (2006) define resilience in terms of the three facets of recovery, resistance and reconfiguration and use the analogy of a tree blowing in the wind to explain these. Recovery involves the tree bending to accommodate the wind and thus preventing it from breaking but when the wind stops the tree resumes its original upright state, resistance refers to the tree standing undisturbed and still in the face of the wind and reconfiguration involves the tree not making a temporary accommodation for the wind but changing its shape so that it can both accommodate prevailing winds and ensure that it is resistant to future winds (Lepore & Revenson, 2006). Thus in this definition posttraumatic growth represents the positive element of reconfiguration as this facet of resistance can involve both positive and negative changes (Ibid).

However, not all researchers subscribe to this position and Bonanno (2004) defines resilience as an individual's ability to maintain relatively stable healthy levels of psychological and physical functioning in the face of exposure to a potentially highly disruptive event, such as the death of a close relation or a life threatening or violent situation. Thus in this view recovery is a stage resilient individuals do not need to attain (Bonanno, 2004). Moreover, Bonanno (2004) argues that because the majority of research in this area has been conducted with clinical populations researchers may have underestimated individuals capacity to maintain a stable equilibrium after extremely aversive events and furthermore suggests that resilience is the most common outcome trajectory for individuals confronted with potentially traumatic events (Bonanno, 2005). There are many studies that support this view; for example, studies of the general population indicate a lifetime prevalence of traumatic events in more than 50% (Breslau, Davis, & Andreski, 1995) but yet the estimated lifetime prevalence of posttraumatic stress

disorder is only 1-3% in the general population (Kessler, 2000). Such findings have also been reinforced by meta-analysis, which found that 50-60% of the population were exposed to traumatic stress but only 5-10% developed posttraumatic stress disorder (Ozer, Best, Lipsey, & Weiss, 2003).

Although resilience and posttraumatic growth are both salutogenic constructs, Tedeschi and Calhoun (2004) have suggested that posttraumatic growth is distinct from resilience, arguing that posttraumatic growth is transformative whereas resilience is not. Furthermore, Tedeschi and Calhoun (2004) suggest that resilient individuals are likely to report relatively little posttraumatic growth because the coping capacities they have means they will be less challenged by trauma. Thus, they will have no need to engage in the meaning-making behaviours that are crucial for posttraumatic growth to occur (Westphal & Bonanno, 2007). Whilst resilient individuals may experience some degree of short-term dysregulation in their emotional and physical well-being (Carver, 1998), when confronted by traumatic events, these reactions tend to be relatively brief and do not tend to impede their functioning to a significant degree (Westphal & Bonanno, 2007). Although resilience is an important factor in the development of psychological change following traumatic events (Wu, Zhang, Liu, Zhou, & Wei, 2015) there is relatively little research examining the relationship between resilience and posttraumatic growth and findings of the studies that have so far been undertaken are contradictory which makes this an important relationship to examine in this thesis.

Levine, Laufer, Stein, Hamama-Raz, and Solomon (2009), using a large sample of adolescents exposed to terror and war, examined the relationship between resilience (defined as the absence of posttraumatic stress disorder) and posttraumatic growth and findings supported Tedeschi and Calhoun's (2004) position in that high levels of resilience were associated with the lowest posttraumatic growth scores. Alternatively, these findings have been explained in terms of posttraumatic growth actually reflecting a positive illusion as has been suggested (Maercker & Zoellner, 2004) and debated in the literature (Sumalla, Ochoa, & Blanco, 2009). In this view, growth involves resorting to unrealistic optimism to deal with adversity (Johnson et al, 2007). However, resilient individuals do not need to use such illusions as their equilibrium remains undisturbed and thus the association between growth and resilience will be negative (Levine et al, 2009). Similar results were also found more recently in a study by Zerach, Solomon, Cohen, and Ein-Dor (2013), with a sample of former prisoners of war and combat veterans, found that resilience (again defined as the absence of posttraumatic stress disorder) and posttraumatic growth were negatively correlated. Zerach et al. (2013) used the literature on the psychobiology of resilience to explain their findings; dispositional optimism and high positive emotionality characterise resilient individuals (Ong, Bergeman, Bisconti, & Wallace, 2006) and accordingly mesolimbic dopamine pathways might be more responsive and/or stress resistant in individuals who remain optimistic in the face of traumatic events (Charney, 2004).

Conversely, research conducted by Bensimon (2012), using a large student sample exposed to a diverse history of trauma, found resilience was positively associated with posttraumatic growth. This positive association between resilience and growth was also found in a subsequent study of 318 earthquake survivors (Wu et al, 2015) suggesting the co-existence of resilience and posttraumatic growth in the face of adversity (Lepore & Revenson, 2006). One possible explanation for the inconsistencies in these results could be the different operationalisations and measurements of resilience that were used (Bensimon, 2012). In both studies, which found a negative correlation between resilience and growth, resilience was conceptualised as a lack of posttraumatic stress disorder. Other researchers, however, have argued that resilience is much more than the absence of posttraumatic stress disorder and defining it as such is akin to defining health as the absence of disease (Almedom & Glandon, 2007). In the studies, which found a positive association between resilience and growth, resilience was assessed by reference to a broad cluster of personal characteristics that facilitate the ability to manage in the face of trauma. These characteristics include hardiness, optimism, self-enhancement, repressive-coping, positive affect and a sense of coherence (Agaibi & Wilson, 2005) and are assessed by the Connor-Davidson Resilience Scale (Connor & Davidson, 2003). There were also differences in participants; the participants in studies which showed resilience was negatively associated with growth were predominantly male (61% and 63.4% of the samples used by Levine et al. (2009) and 100% of the sample used by Zerach et al. 2013) whereas there were more female than male participants in the studies which showed resilience was positively associated with growth (66.6% of the sample used by Bensimon (2012) and 52.2% of the sample used by Wu et al. 2015) and it has been suggested that women experience higher levels of growth than men (Tedeschi & Calhoun, 1996).

3.7 Posttraumatic Growth and Coping

Yeung, Lu, Wong, and Huynh (2016) argue that the Stress and Coping Model, proposed by Lazarus and Folkman (1984), provides an appropriate framework to understand posttraumatic growth after trauma. According to this model, when faced with a stressful event an individual will evaluate the demands of the stressor and the available coping resources, appraise the potential impacts of the stressor and identify potential coping options (Lazarus & Folkman, 1984). After going through this process, the individual will decide which strategies to use to cope with the stressor. Thus, coping strategies are defined as "the constantly changing cognitive and behavioural efforts to manage specific external and internal demands (and conflicts between them) that are appraised as taxing or exceeding the resources of a person" (Lazarus, 1991, p. 112).

Within the literature, two coping strategies have consistently been shown to be associated with higher levels of posttraumatic growth. Firstly, positive re-appraisal, defined as construing a stressful transaction in positive terms, (Carver & Scheier, 1989) has been suggested as being crucial for successful adaptation to traumatic events and a pre-requisite for growth to occur (Calhoun & Tedeschi, 1998). Many subsequent studies have consistently

demonstrated a positive association between this coping strategy and posttraumatic growth. For example, a cross-sectional study using a sample of cancer patients conducted by Urcuyo, Boyers, Carver, and Antoni (2005) found positive re-appraisal coping was positively related to posttraumatic growth. Although the cross-sectional design of this study prevents the identification of a causal relationship these results still held when a longitudinal design was employed. For example, Sears, Stanton, and Danoff-Burg (2003), again using a sample of cancer patients, found that positive re-appraisal coping was a significant predictor of posttraumatic growth. However, although a lot of this research has been carried out in the area of oncology, such results have also been found across other populations. Recent research carried out by Yeung et al. (2016), used a large sample of college students and reported positive re-appraisal was associated with higher posttraumatic growth. Results of meta-analysis have also borne out these results; for example, Helgeson et al. (2006) found that the relation of positive re-appraisal to posttraumatic growth was the largest effect size in the entire meta-analysis, which consisted of 87 studies. It may be that individuals who use more positive re-appraisal framing tend to see negative events as opportunities to strengthen relationships and learn new things (Yeung et al, 2016), which is why they are more likely to find meaning in the traumatic event and thus experience posttraumatic growth (Park et al, 2008).

Frazier et al. (2009) have suggested that these results could be explained by a conceptual overlap between the two constructs. However, Yeung et al. (2016) found that the correlation between these two variables did not exceed .50, and believes that this together with the studies providing evidence of the unique predictors for positive re-appraisal (discussed above) makes this an unlikely explanation. These two constructs are related but distinct from each other and a more plausible explanation appears to be that an individual's efforts to positively interpret a traumatic event could act as a self-fulfilling prophecy and thus lead to posttraumatic growth (Prati & Pietrantoni, 2009).

Acceptance is the second coping strategy associated with higher levels of growth, the ability to accept situations that cannot be changed has been argued to be crucial for adaptation to uncontrollable or unchangeable events (Zoellner & Maercker, 2006). Therefore, accepting that the traumatic event has happened is proposed by Calhoun et al. (2000) as being one of the factors that can lead to posttraumatic growth and several studies have demonstrated the link between acceptance coping and posttraumatic growth. For example, Park et al. (1996), using a sample of college students found that acceptance coping was a significant predictor of posttraumatic growth and acceptance coping was significantly related to posttraumatic growth in a sample of cancer patients (Urcuyo et al, 2005). These findings were further supported by meta-analysis carried out by Helgeson et al. (2006) and Prati and Pietrantoni (2009) respectively, both of which found a positive relationship between acceptance coping and posttraumatic growth as did Linley and Joseph (2004) review of 39 studies of different trauma types. It may be that acceptance coping allows individuals to integrate the traumatic event with other aspects of their life and this integration eventually

paves the way for enhanced functioning and posttraumatic growth (Brooks & Matson, 1982).

The relationship between coping strategies and posttraumatic growth is an important one to examine in this thesis as understanding of these pathways could lead to the development and implementation of interventions targeting coping, thus assisting individuals to respond more effectively when faced with traumatic events (Park, Aldwin, Fenster, & Snyder, 2008).

3.8 Posttraumatic Growth and Time

Another variable, which has been examined in this area of research, is the period of time that has passed since the traumatic event and the influence this has on posttraumatic growth. Tedeschi and Calhoun's (1996) original research found that posttraumatic growth was unrelated to the passage of time suggesting that individual characteristics and the circumstances they face as they deal with the aftermath of traumatic events are more important in determining posttraumatic growth than the passage of time. However, if posttraumatic growth is a process that unfolds gradually over a period as individuals accommodate the new trauma related information (Joseph & Linley, 2005) it is likely that it positively correlates with time elapsed since the traumatic event (Prati & Pietrantoni, 2009). Furthermore, Prati and Pietrantoni (2009) pose the possibility of a curvilinear relationship, when more time since the trauma has elapsed (they suggest decades) posttraumatic growth decreases.

However, findings in this area are mixed with some studies providing evidence for this positive relationship whilst other studies have not. Polatinsky and Esprey (2000) used a sample of bereaved parents and found that the longer the time had elapsed since bereavement the greater posttraumatic growth was reported. This study focused on a very specific and homogenous population, however, and it may be that there is something unique about the experience of losing a child meaning that such results cannot easily be generalised to individuals encountering other types of traumatic events. In this instance, the passage of time is believed to play an important role in the healing process (Reif, Patton, & Gold, 1995). Similar findings were reported by Cordova et al. (2001), using a sample of breast cancer patients, reported that longer time since diagnosis was associated with greater posttraumatic growth. It may be that this is not related to the passage of time per se but it reflects opportunities for the individuals to engage in the cognitive, affective and interpersonal processes that promote posttraumatic growth (Cordova et al, 2001).

Conversely Morris et al. (2005) used a sample of undergraduate students who had experienced a traumatic event, found no association between overall levels of posttraumatic growth and time since the traumatic event. As the range of time since traumatic event was considerable in this study, 0-35 years, the results suggest that participants were able to demonstrate growth regardless of the amount of time that had passed (Morris et al, 2005). Furthermore, in this study, time since the traumatic event was negatively correlated with the relating to others domain of posttraumatic growth suggesting

that growth in this area was greater closer to the traumatic experience (Morris et al, 2005). Time since trauma was also found to be unrelated to posttraumatic growth scores in subsequent research conducted by Shakespeare-Finch, Martinek, Tedeschi, and Calhoun (2013), using a sample who had experienced differing traumatic experiences. However, the sample was small and therefore may lack generalisability. The passage of time had no effect on posttraumatic growth in a population of individuals coping with heart disease conducted by Sheikh (2004), which was suggested to be reflective of individual differences in the amount of time taken in the process of recovering from a traumatic event.

The majority of studies in this area are cross-sectional and there is a dearth of longitudinal research with very few assessing growth (and distress) at more than one time point (Frazier, Conlon, & Glaser, 2001). One longitudinal study carried out by Frazier, Conlon, and Glaser (2001) using a large sample of sexual assault survivors found that as early as two weeks after the sexual assault many of the participants reported posttraumatic growth particularly in the areas of increased appreciation of life, closer relationships with others and increased empathy. Posttraumatic growth did increase over time but the period between two weeks and two months after the assault was when the greatest increases were experienced (Frazier et al, 2001) contradicting the notion that posttraumatic growth is a process that unfolds gradually over time (Joseph & Linley, 2005). Posttraumatic growth remained consistent throughout one year (Frazier et al, 2001). However, the sample used was exclusively female and some research suggests that females experience higher levels of posttraumatic growth than males (Tedeschi & Calhoun, 1996). Secondly, data was not collected using a well validated measure of growth such as The Posttraumatic Growth Inventory but instead a measure specifically developed for this study (Frazier et al, 2001).

Some of the most recently published research in this area, carried out by Morgan and Desmarais (2017) investigated the relationship between time since the event and posttraumatic growth in a sample of military veterans using cluster-analytic techniques. Results revealed four significantly different groups characterized by differential associations between posttraumatic growth and time, which also differed on a number of constructs believed to be central to the development of posttraumatic growth (Morgan & Desmarais, 2017). The group with the lowest reported posttraumatic growth was characterised by minimal posttraumatic growth regardless of time, the least challenge to core beliefs and less intrusive and deliberate rumination (Ibid). Conversely, the group with the highest reported posttraumatic growth was characterised by a greater degree of posttraumatic growth regardless of time, greater challenge to core beliefs, the highest amount of deliberate rumination and the highest amount of symptoms of posttraumatic stress (Ibid). The other two groups were the long-term small growth group, which was primarily characterised by small increments of posttraumatic growth over longer periods of time whilst the fourth group, immediate moderate-growth group, experienced moderate levels of posttraumatic growth over shorter periods of time as well as high levels of posttraumatic stress symptoms. (Ibid). Participants in this fourth group were also significantly younger in age (Ibid).

The authors suggest therefore, that the relationship between posttraumatic growth and time is heterogeneous in nature thus explaining the previous inconsistent findings from studies that assumed that time and posttraumatic growth demonstrate the same association across participants (Morgan & Desmarais, 2017). However, once again, conclusions are limited by the cross-sectional nature of the study and further research is needed to see whether such findings could be replicated to other trauma-exposed samples (Ibid).

Thus, the relationship between time and posttraumatic growth is currently far from clear and consequently researchers have called for further work to be conducted to clarify the impact that time since traumatic event has on the development of posttraumatic growth (Morris et al, 2005). The variable of time may take on additional significance within the Fire and Rescue Service, however, as firefighters potentially face cumulative exposure to traumatic events over the course of their career. Therefore, these contradictory findings suggest that further investigation of the variable of time is important in furthering understanding of posttraumatic growth in general and in the context of working within the emergency services in particular.

3.9 Posttraumatic Growth and Well-Being

Well-being is predominantly divided into two constructs in the literature; subjective well-being (SWB), sometimes referred to as the hedonic perspective, and psychological well-being (PWB), sometimes referred to as the eudaimonic perspective, and there are important conceptual differences between the two (Durkin & Joseph, 2009). SWB refers to a short term subjective view and can broadly be defined as an individual's emotional states (Joseph et al 2012) whereas PWB refers to an individual's long term development and to existential engagement with life (Durkin & Joseph, 2009). The concept of posttraumatic growth is derived from the eudaimonic tradition (Keynes et al, 2002) and therefore aligns more closely with PWB. However, within the literature, the terms SWB and PWB have been used interchangeably (Durkin & Joseph, 2009) and researchers have used a myriad of different terms related to well-being such as adjustment with no clear explanation of exactly what is meant by this.

A key area of debate within the literature is whether posttraumatic growth is related to other measures of psychological functioning and in particular emotional distress and well-being (Calhoun & Tedeschi, 2013). Zoellner and Maercker (2006) argue that for posttraumatic growth to be a phenomenon worthy of study in clinical research then it is assumed to make a difference in individuals lives by affecting levels of distress and well-being and moreover, they argue that if it does not then posttraumatic growth is no more than an "interesting phenomenon possibly belonging to the area of social, cognitive or personality psychology" (p. 631). Other researchers have expressed similar sentiments, for example, Hobfoll et al. (2007) argued that posttraumatic growth should only be promoted as a positive phenomenon if and when its links to psychopathology are more clearly

understood. However, to date empirical research examining the relationship between posttraumatic growth and general psychological well-being has produced some inconsistent findings (Cho & Park, 2013). Moreover, different reviewers have come to contradictory conclusions when reviewing the literature on posttraumatic growth and well-being (Zoellner & Maercker, 2006). For example, Affleck and Tennen (1996) conclude that research in this area "is beginning to document its unique ability to predict emotional well-being" (p.904), whilst Filipp (1999) argues that the research "is highly limited with regard to its adaptive value" (p.72-73).

A number of studies have reported an association between posttraumatic growth and positive well-being in a variety of different populations. For example, Carver and Antoni (2004) using a longitudinal research design with a participant group of cancer patients found that posttraumatic growth predicted more positive emotions and self-judged quality of life and less negative emotion and depression from four to seven years after their initial participation. Ickovics et al. (2006) in a prospective study examining the relation of posttraumatic growth to distress over an 18 month period among urban adolescents, found that posttraumatic growth was associated with subsequent reductions in both short and long term emotional distress when baseline emotional distress was controlled for. Linley, Joseph, and Goodfellow (2008) used a mixed sample of individuals who had undergone a variety of traumatic experiences; found that posttraumatic growth predicted less symptoms of posttraumatic stress, depression and anxiety six months after initial participation. More recently Triplet et al. (2012), using an undergraduate student sample, found that posttraumatic growth was significantly associated with life satisfaction.

However, conversely there are also a number of studies, again undertaken using a variety of different samples that failed to support this positive relationship. For example, Cordova et al. (2001) again using a participant group of cancer patients found that posttraumatic growth was unrelated to depression and well-being. One potential explanation for these discordant findings could be the differing time frames involved: participants in the Carver and Antoni (2004) study had experienced cancer between four and seven years previously whereas participants in the Cordova et al. (2001) study had all experienced cancer less than five years previously. Bellizzi et al. (2009) found an inverse association between posttraumatic growth and mental-health related quality of life in a sample of survivors of breast cancer. Participants in this study were recruited approximately six months after diagnosis and subsequent data collection took place at approximately 24 months and 35 months after baseline. Although they describe these findings as unexpected, they posit that maybe growth co-occurs with distress and perhaps participants in this study were still struggling with their disease (Bellizzi et al, 2009). Thus, it is reasonable to conclude that the amount of time that has passed since the traumatic event may have an impact on levels of posttraumatic growth.

Helgeson et al. (2006) examined potential moderators in the relationship between posttraumatic growth and a number of health outcomes in their meta-analysis and found that the one of most interest was time since the trauma occurred. They concluded that growth is more likely to be related to a good outcome when a longer time had elapsed since the trauma; a stronger positive relationship was found in the case of reduced depression and greater positive affect when at least two years had passed since the trauma (Helgeson et al, 2006). In a review of the literature on the relationship between posttraumatic growth and mental health, Zoellner and Maercker (2006) found that studies where there was either no relationship or a negative relationship between growth and adjustment, were mainly cross-sectional whereas all the longitudinal studies included in the review found a positive relationship between growth and adjustment, thus, suggesting that the adaptive value of posttraumatic growth can only be discovered over a period of time. However, according to Linley and Joseph (2004) it is likely that it is the intervening events and processes that influence this relationship, rather than the passage of time per se. Although there is no further explanation of what is meant by this it is likely that they are referring to the individual's social system and self-disclosure discussed in Tedeschi and Calhoun's (2004) model. Park and Fenster (2004), using an undergraduate student sample, found that posttraumatic growth was once again unrelated to depressive symptoms. This finding is understandable given that negative thinking usually accompanies a depressed mood making it less likely to perceive any positive aspects of the situation (Zoellner & Maercker, 2006).

Helgeson et al. (2006) conducted a meta-analysis of 87 studies in an attempt to address these discordant findings but actually supported previous contradictory findings concluding that posttraumatic growth was associated with lower levels of depression and higher levels of well-being but was unrelated to anxiety, global distress or quality of life. Posttraumatic growth was however, related to more intrusive and avoidant thoughts (Helgeson et al, 2006) which was interpreted as supporting Tedeschi and Calhoun's (2004) model in which rumination is a precursor to growth. The fact that all the studies included in the meta-analysis were cross-sectional and conducted over varying time frames could be considered as a limitation of the study (Park & Helgeson, 2006) as there is no way of knowing if growth leads to better mental health or whether better mental health leads to growth (Helgeson et al, 2006).

Tedeschi and Calhoun (2004) argue that the absence of consistent relations between growth and distress is not a limitation of the concept of posttraumatic growth but is due to the fact that posttraumatic growth and traditional measures of psychological adjustment are independent because domains of growth are conceptually distinct from general emotional adjustment. Growth is not the same as an increase in well-being or decrease in distress and therefore for some people growth and emotional distress may well co-exist (Tedeschi & Calhoun, 2004). Furthermore Durkin and Joseph (2009), using a sample of college students, found that posttraumatic growth was related to psychological well-being (existential engagement with life, purpose, autonomy, and mastery) over and above subjective well-

being. Thus, it has been argued that growth may be best conceptualized as an outcome of value in its own right rather than a predictor of well-being (Park & Helgeson, 2006).

Cho and Park (2013) posit that the relationship between growth and well-being is a complex one and that underlying third variables may be able to account for these discordant findings. For example, in the study by Triplett et al. (2012) posttraumatic growth had a significant but weak direct association with life satisfaction. However, the indirect path, from growth to life satisfaction via the presence of meaning in life was also statistically significant (Triplett et al, 2012). Thus, these results suggest that whilst posttraumatic growth can have a positive effect on well-being, this effect may be primarily indirect through the influence that posttraumatic growth has on providing an increased sense of meaning and purpose in life (Tedeschi & Calhoun, 1995). The presence of meaning in life may indicate that the individual has been able to make sense or find meaning in the traumatic event and perhaps has construed a new set of core beliefs that accommodate these events (Triplett et al, 2012). In a study conducted by Yanez, Stanton, Hoyt, Tennen, and Lechner (2011), posttraumatic growth predicted increased positive mood but greater approach-orientated coping fully mediated this link.

Demographic variables may also moderate the relation of posttraumatic growth to well-being outcomes. A meta-analysis conducted by Helgeson et al. (2006) concluded that ethnic minorities were more likely to experience growth but also that links between growth and well-being were stronger in studies that consisted of a larger percentage of minority participants leading them to conclude that posttraumatic growth may be more adaptive for people who are of a minority ethnicity or race. The reasons for this remain unclear but Helgeson et al. (2006) suggest that perhaps posttraumatic growth is interpreted differently across ethnic groups or alternatively perhaps minority persons' greater experience of adversity leads to a stronger pattern of deriving positive changes from it.

In addition it is possible that these inconsistencies may be explained by a number of issues that make it difficult to interpret results, or compare across studies, such as different measures of growth being used, for example validated questionnaires (of which there are several different ones available) or interviews (Cho & Park, 2013). There is also considerable variation in the severity and types of trauma studied ranging from sudden, relatively short-term traumatic events (such as a terrorist attack) to more long-term stressors such as chronic illness or foreseeable death of a loved one; the adaptation processes to these different types of events may differ from one another and growth may play a different role for different kinds of traumatic events (Zoellner & Maercker, 2006). Cho and Park (2013) call for more studies to be undertaken in this area, which together with the discordant findings means that the relationship between posttraumatic growth and well-being would appear to be an important relationship to examine in this thesis in order to elucidate this further.

As posttraumatic growth aligns more closely with PWB this thesis used the conceptual framework of psychological well-being in study two and specifically the model put forward

by Ryff (1989), (see 6.4 for full discussion on the rationale for using this model). Ryff (1989) argued for a move to well-being away from measures of happiness and satisfaction and suggested that well-being consists of six separate dimensions rather than being simply a set of positive and negative behaviours, which exist on a continuum. These separate dimensions are, self-acceptance, environmental mastery, positive relations with others, purpose in life, autonomy and personal growth (see 7.6 for full description of each of these dimensions).

3.10 Posttraumatic Growth and Culture

Although posttraumatic growth was developed within a Western cultural framework, there are a growing number of empirical studies demonstrating its existence within many other cultures. For example, posttraumatic growth has been reported in Chinese (Ho, Chan, & Ho, 2004), Japanese (Taku, 2013), South African (Peltzer, 2000) and Israeli (Laufer & Solomon, 2006) populations to name but a few. The conclusion drawn from this accumulating evidence is that at a meta-theoretical level the concept of growth following exposure to trauma is universally acceptable (Splevins, Cohen, Bowley, & Joseph, 2010).

However, whilst it may be accepted that the concept of posttraumatic growth is universal rather than an exclusively Western idea, models of growth have been critiqued for their lack of consideration of the ways that cultural narratives shape individual's understanding and expectations of posttraumatic growth (Pals & McAdams, 2004). Higher rates of posttraumatic growth have been recorded in the US as compared to non-Western cultures (Taku, Cann, Tedeschi, & Calhoun, 2009; Taku, 2013; Taku & Cann, 2014), which could be a consequence of an American culture which embraces an optimistic, forward and onward looking life story (Pals & McAdams, 2004; McMillen, 2004). McMillen (2004) argues that the influence of culture is the most glaring omission from Tedeschi and Calhoun's (2004) model of growth (although still accepting that this omission does not cast doubt on the model's underlying foundations) and other researchers agree that application of theories of posttraumatic growth, developed within Western culture, may reflect a cultural bias representative of individualistic societies (Splevins et al, 2010).

The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) was developed from a literature review of studies reporting positive changes (the number of studies from non-western populations was not reported) and validated using a student population in the US, who had experienced a range of traumatic events (Splevins et al, 2010). Although the resulting five factors are purported to encapsulate all possible growth outcomes (Tedeschi & Calhoun, 1996) it may be that consequently some items reflect a Western individualistic understanding of posttraumatic growth (Splevins et al, 2010). For example, items measuring changes in personal strength (such as changes in feelings of self-reliance) contain the implicit assumption of the self as a distinct and separate entity (Ibid). Individuals living in a Western culture, which places emphasis on independence and self-enhancement, are more likely to consider this a good indicator of personal growth rather than individuals living in cultures, which emphasises interdependence and self-criticism (Taku, 2013).

Researchers have however, attempted to increase the reliability and validity of the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) in other cultures by making various adaptations to address the inherent cultural bias in some of the items. It has been argued that cultural insensitivity can arise from attempting to translate measures exactly from one language to another (Rogler, 1999). Therefore, rather than just translating the inventory a number of studies have reworded items to make them more meaningful in a specific culture (Powell et al, 2003; Taku et al, 2007) whilst others have attempted to gain conceptual as well as linguistic equivalence (Ho et al, 2004; Weiss & Berger, 2008).

However, even if there is some universality in reports of posttraumatic growth across different cultures it would appear that further research is required in order to fully understand these cross-cultural issues (Cho & Park, 2013). Thus, whilst the current programme of research was situated within a Western individualistic culture, it sought to elucidate any cultural differences inherent in the understandings and experiences of posttraumatic growth of individuals in the UK.

3.11 Associated Issues

Misunderstandings and Misconceptions
In response to an article about posttraumatic growth that appeared in The Psychologist (Joseph, 2012) Rana (2013) wrote that it was essential to "guard ourselves about becoming over-optimistic about the theory of posttraumatic growth" (p.5) as it is imperative to remain aware of the serious nature of posttraumatic stress disorder and the fact that not everyone having traumatic experiences will demonstrate growth. It has also been suggested that advocates of posttraumatic growth are in some way positing the view that engaging with trauma is a good thing, therefore it is important to clear up this misunderstanding and note that researchers in this area are in no way inadvertently suggesting that engaging with trauma is positive but merely that adversity is an unavoidable part of life for many people (Joseph, 2012). Calhoun and Tedeschi (1998) suggest that particularly within clinical settings it is important to view growth as originating from within the individuals struggle with an event and not the event itself. Individuals who experience adverse life events will also experience varying degrees of distress of varying amounts of duration and although posttraumatic growth may be common, adversity does not lead to positive changes for everyone (Joseph, 2012). Thus we may need to be wary of what Lechner and Antoni (2004) have called the "tyranny of positive thinking" (p.39) and particularly in therapeutic settings clinicians need to be careful not to inadvertently imply that an individual has in some way failed if they do not report experiencing posttraumatic growth (Joseph, 2015). However, the study of posttraumatic growth suggests that posttraumatic stress and posttraumatic growth are not at separate ends of a continuum, neither are they unrelated or separate phenomena but rather two aspects of human experience, which follow trauma and are associated with each other in a variety of ways (Linley & Joseph, 2004). This is the position taken within this

thesis and in taking this position advocates a more comprehensive approach, one that accommodates both positive and negative dimensions (Paton, 2006).

Paton (2006) argues that accommodating the dichotomous nature of stress outcomes is particularly important for emergency professions who are repeatedly exposed to potentially traumatic incidents over the course of their careers, as traumatic stress risk management will have to facilitate positive outcomes and minimise negative outcomes.

Problems of Measurement
Ford et al. (2008) has suggested that serious methodological issues exist in this research area due to an over reliance on self-report measures together with a lack of longitudinal studies that include pre-event data. Self-report measures require participants to rate the extent to which they have changed as a result of their traumatic experience. However, such measures are inherently vulnerable to error because of the difficultly individuals have in recalling past states which makes it unlikely that they can make an accurate comparison between past and current states in order to estimate the extent of growth that has been experienced (Frazier & Kale, 2006). Ford et al. (2008) describe the five stage complex cognitive processes that participants are required to engage in when completing one of these measures; they must evaluate their current standing on the particular dimension, recall their previous standing on that dimension, compare these standings, assess the degree of change and decide how much of the change can be attributed to the traumatic event. Thus, it has been concluded from this that participants cannot accurately generate this information and therefore what is actually being measured is perceived growth rather than actual growth (Frazier et al, 2009).

Certainly, there is some support for this view, for example Frazier et al. (2009), using a sample of 1,528 undergraduate students found that ratings of how participants thought they had changed did not correspond well with actual changes. However, there are a number of methodological flaws in this study, which should be acknowledged (Johnson & Boals, 2015). A modified version of the posttraumatic growth inventory was used, called the C-PTGI, in an attempt to measure the amount of growth between the two time points, which represented an individual's rating of their current standing on the domains of the PTGI. Five other self-report measures were used to represent the domains of the PTGI, which means that they represent an individual's perception as much as the PTGI does (Ibid). Secondly, not all the measures used had psychometric support, for example the Religious Commitment Inventory, was used in a five-item format and there was no identifiable psychometric support for this in the literature (Ibid). Finally Frazier et al. (2009) themselves acknowledged that perceived and actual growth may have been measured too soon (two months after the traumatic event) if indeed two years is the requisite amount of time needed to detect posttraumatic growth (Helgeson et al, 2006). In order to ameliorate these concerns in this programme of research only measures were used that displayed strong psychometric properties (these are discussed in detail in chapter 6). Also in study two a

question was inserted in the questionnaire asking how long ago had the traumatic incident occurred, which allowed for an examination of the role that time played in the development of posttraumatic growth.

Conversely, other researchers investigating the validity of these self-report measures have examined the extent to which participants reports of growth are reliably corroborated by significant others. Shakespeare-Finch and Enders (2008) using a sample of 61 trauma survivors and their significant others found a significant correlation between the trauma survivors reports of growth and what the others reported seeing. Similarly, Weiss (2002) compared growth scores of breast cancer survivors and found a moderate positive correlation between them and their husband's perceptions. More recently, Shakespeare-Finch and Barrington (2012) extended this area of research by investigating whether positive behavioural changes undertaken by trauma survivors would be corroborated by significant others, and found that survivors and significant others not only reported a similar level of cognitive growth in the survivor but changes to their behaviour as well.

Additionally the validity of self-report measures has been challenged on the basis that some reports of positive change are illusory and a way of coping with distress (Zoellner & Maercker, 2006) or due to positive reporting biases. A number of studies found no association between social desirability and participants reports of posttraumatic growth, however, (Salsman, Segerstrom, Brechting, Carlson, & Andrykowski, 2009; Wild & Paivio, 2004). Moreover, the findings of a 2004 study undertaken by Smith and Cook found that current models for assessing posttraumatic growth may actually underestimate growth particularly in the areas of personal strength and relating to others. Therefore whilst it may be prudent to exercise caution in interpreting reports of growth as undoubtedly there is likely to be errors in all self-report measures (Calhoun & Tedeschi, 2004), research has shown that positive illusions may assist individuals in successfully adjusting to traumatic events such as being diagnosed with breast cancer (Taylor, 1983). Furthermore, it has been argued that self-serving bias, presents a necessary feature of psychological adjustment and healthy coping particularly in the context of traumatic events (Taylor & Brown, 1988). Certainly, the majority of research in the area remains cross-sectional whereas prospective longitudinal designs are needed in order to further our understandings of the process of growth, but given that it is impossible to predict who will engage with traumatic events, such designs are often not possible (Joseph & Linley, 2008). However, it does appear that even when before and after measures are employed the notion of positive change is still substantiated (Peterson & Seligman, 2003). The nature of their daily work activities means that the majority of Fire and Rescue Service personnel will have encountered at least one work related traumatic incident (Pinto, Henriques, Jongenelen, Carvalho, & Maia, 2015) and therefore, it was not feasible to attempt to recruit a sample in this population who had yet to engage with a traumatic event. Moreover, this programme of research was exploratory and cross-sectional research has been described as "an ideal method for describing a broad

picture, desirable when conducting exploratory research into a specific population"
(Shakespeare-Finch et al, 2003, p.61).

3.12 Posttraumatic Growth and the Fire and Rescue Service

Repeated exposure to traumatic events
Emergency workers have a high probability of repeated exposure to potentially traumatic events while completing their daily work activities (Berger et al, 2012). Studies suggest that between 56% and 88% of emergency workers have been exposed to at least one traumatic incident (Bryant & Harvey, 1996; Alexander & Klein, 2001; Haslam & Mallon, 2003; Del Ben, Scotti, Chen, & Fortson, 2006). Firefighters deal with a wide variety of complex and hazardous situations, which include dealing with fires, cutting casualties out of road traffic accidents, providing first aid to casualties, potential suicides and handling dead bodies (Moffitt et al, 2014). In line with this elevated risk of exposure to traumatic events, emergency workers are considered to be at high risk of developing posttraumatic stress disorder (Haslam & Mallon, 2003). Thus, it is not surprising that the research on the emergency services has primarily focused on posttraumatic stress (Armstrong et al, 2014). Research suggests that the rate of posttraumatic stress disorder in emergency workers is higher than in the general population (Wagner, McFee, & Martin, 2010) and although inconsistencies exist in prevalence rates figures as high as 20% have been reported (Heinrichs et al, 2005). However, Kehl, Knuth, Hulse, and Schmidt (2014) argue that working as part of a team, having colleagues depend on them and being labelled as heroes by the media may make firefighters, in particular, less willing to disclose being affected by traumatic incidents.

Paton (2005) suggests that dealing with traumatic incidents trigger psychological disequilibrium in emergency workers, a period in which existing schemata no longer have their capacity to organise experience in ways which are meaningful. Thus, the traumatic incident acts as a catalyst for change and the resulting new post-incident equilibrium can be characterised by either loss or growth depending upon how the experiences of trauma interact with the resources and processes that are activated to confront these discordant experiences (Paton, 2005). By virtue of the fact that they fulfil an emergency response role members of the emergency services cannot excise any choice about the work they undertake (Ibid). However, by identifying the resources and processes that contribute to emergency workers ability to make sense of or interpret traumatic experiences in ways that facilitate posttraumatic growth, emergency organizations can make choices about the personality, dispositional and cognitive appraisal that their workers bring to bear on their traumatic experiences (Ibid). In turn this can increase the likelihood of personnel experiencing positive outcomes (Ibid).

Traumatic reactions

Posttraumatic Stress Disorder (PTSD) is the most extreme stress reaction to a traumatic event and according to the fifth edition of The Diagnostic and Statistical Manual of Mental Disorders (DSM V) (American Psychological Association, 2013) this is characterised by four types of symptoms known as re-experiencing, avoidance, changes in mood and cognition and arousal and hyper-reactivity. Re-experiencing includes symptoms such as intrusive thoughts, nightmares and flashbacks when individuals are exposed to stimuli that remind the person of the traumatic event. Avoidance relates to pushing trauma related thoughts and feelings out of one's mind or avoidance of trauma related reminders. Changes in mood and cognition includes symptoms such as negative affect, feeling isolated and decreased interest in activities. Arousal is characterised by irritability, aggression, risky or destructive behaviour and experiencing difficulty concentrating or sleeping.

However, although firefighters do have an elevated risk of developing Posttraumatic stress disorder (Corneil, Beaton, Murphy, Johnson, & Pike, 1999) the majority of firefighters do not develop psychological problems as a result of dealing with traumatic incidents (Lambert, Benight, Harrison, & Cieslak, 2012). Research has examined a number of factors that distinguish those firefighters who do develop psychological difficulties from those who do not and one such factor that has been examined is the use of coping strategies.

Risk and Protective Factors

Research suggests that emergency services personnel utilise both task-orientated coping (attempts to eliminate or modify sources of stress through action), emotion-orientated coping (behavioural and cognitive responses aimed at managing emotional reactions to a stressor and maintaining emotional equilibrium) and avoidant orientated coping (attempts to actively avoid confronting the problem) (Rowe & Regehr, 2010). When attending critical incidents emergency services personnel become highly task-orientated whilst at the same time working to maintain emotional control (Ibid). A qualitative study, using a sample of paramedics, found that emotion-orientated coping strategies were the most frequently described where participants consciously attempted to shut down their own emotions by shutting out the emotional reactions of other individuals present and focusing on the next technical step to be carried out (Regehr, Goldberg, & Hughes, 2002). Following the event a further cognitive strategy was employed which involved identifying learning opportunities after reviewing the event from a technical standpoint (Ibid). It is possible that over time emergency services workers experience a certain degree of desensitisation, which allows them to function in an empathetic yet detached manner (Wright, Powell & Ridge, 2006).

The use of avoidance coping has consistently been associated with higher levels of posttraumatic stress symptoms in firefighters, in both cross-sectional studies (Brown, Mulhern, & Joseph, 2002; Chang et al, 2003;) and longitudinal designs (Beaton, Murphy, Johnson, Pike, & Corneil, 1999). Conversely, task-focused coping and emotion-focused

coping (Brown et al, 2002) as well as positive re-appraisal (Chang et al, 2003) have all been associated with lower levels of posttraumatic stress symptoms.

Seeking support from others appears to be a coping strategy that is favoured by firefighters (Chamberlin & Green, 2010) and social support is consistently found to be associated with the occurrence of symptoms of posttraumatic stress (Regehr, 2009) with lower levels of perceived social support being a significant predictor of posttraumatic stress disorder (Meyer, Zimering, Daly, Knight, & Kamholz, 2012). Social support from superiors within the organisation has been found to influence rescue workers responses to traumatic events (Weiss, Marmar, Metzler, & Ronfeldt, 1995) and when individuals feel valued and supported they experience lower levels of distress (Regehr, 2009). The support of family is also paramount in reducing the impact of dealing with traumatic incidents on emergency services personnel (Regehr, 2009) and research, using a sample of firefighters, demonstrated that social support provided by family and friends was significantly negatively correlated with posttraumatic stress symptoms (Regehr, Hemsworth, & Hill, 2001). Emergency service workers who had higher levels of support were less likely to take time off from work with stress following a traumatic incident (Regehr, Goldberg, Glancy, & Knott, 2002).

However, although social support is often a protective factor in managing traumatic reactions (Regehr, Hill, & Glancy, 2000) evidence suggests that as firefighters progress in their career perceived levels of support both from family and their employer are reduced (Regehr, 2009). Two possibly explanations are offered for this. Firstly, cumulative trauma exposure leads to a type of social burnout that affects the individual's ability to nurture and develop relationships within their personal lives and the organisation (Regehr, 2009). Secondly, the two sources of social support, co-workers and family, place competing demands on the individual's time and emotional resources, eventually leaving firefighters with reduced ability to obtain support from either source (Ibid).

Rowe and Regehr (2010) posit that of the multiple types of coping used in the emergency services the use of black humour or gallows humour, involving the juxtaposition of morbid and farcical elements, is one of the most familiar. It has been argued that this type of humour represents a philosophical attitude, a way of maintaining sanity in the face of insane circumstances (Kuhlman, 1988). Thus, in terms of the emergency services it is a means for personnel to manage the emotional toll of dealing with traumatic incidents (Rowe & Regehr, 2010). Furthermore, Rowe and Regehr (2010) assert that the use of black humour by emergency personnel when dealing with traumatic incidents serves three functions; provides a way of venting their feelings, evokes social support through the development of group cohesion and puts distance between themselves and the situation to ensure that they can act effectively.

Posttraumatic Growth

Whilst research into posttraumatic growth has increased in recent years the majority has focused on lay populations (Paton, 2006) and there is far less empirical evidence investigating posttraumatic growth in work-related populations and in particular the emergency services (Shakespeare-Finch et al, 2003). However, studies that have been undertaken in this area have consistently demonstrated the existence of posttraumatic growth within emergency service populations. For example, Shakespeare-Finch et al. (2003), using a large sample of operational ambulance personnel found that 98.6% of participants reported that they had experienced at least one positive change following the experience of a work-related traumatic incident. The largest positive changes occurred in the domains of personal strength, appreciation of life and relationships with others (Shakespeare-Finch et al, 2003). Oginska-Bulik and kobylarczyk (2015), using a sample of paramedics, found that all 80 participants reported experiencing some posttraumatic growth, the largest changes being reported in the areas of personal strength and increased appreciation of life. Kehl et al. (2014) using a sample of 3,011 firefighters across eight predominantly European countries, reported that 51.7% of participants experienced posttraumatic growth to some degree. Of the limited empirical research that has investigated the factors related to posttraumatic growth within Fire and Rescue Service personnel trauma source, organisational belongingness and self-care coping was found to be significantly related to posttraumatic growth (Armstrong et al, 2014).

Firefighter's daily working activities means that they are repeatedly exposed to potentially traumatic incidents, which makes them an ideal group to explore the positive adaptations of traumatic exposure, the findings of which can be used to inform current models of growth. However, the paucity of research in this area also clearly warrants the further investigation of both the existence of posttraumatic growth in this population and the variables that contribute to it. Understanding the factors that promote growth within this population can help in designing interventions that will enable firefighters to perceive positive benefits from their work, which in turn may bolster their well-being and ensure that they remain in their work role for longer (Armstrong et al, 2014).

3.13 Personality and the Fire and Rescue Service

The existence of a rescue personality was proposed by Mitchell and Bray (1990) who suggested that individuals involved in the emergency services share a number of characteristics and are action orientated, inner-directed, easily bored, traditionally socially conservative, highly dedicated and obsessed with high standards of performance. Moreover, these authors assert that emergency service personnel chose their careers because they have 'very different personalities from the average person' (Mitchell & Bray, 1990, p.19). Thus, these assumptions argue for a predisposition model rather than a socialization model and lead to the conclusion that this personality profile is pre-existing and independent of the duration of service (Klee & Renner, 2013). This rescue personality

was also claimed to be found in voluntary as well as professional emergency service workers (Mitchell & Bray, 1990).

However, a number of criticisms have been made about the concept of the rescue personality. Firstly, in this construct the professions of police officers, firefighters and paramedics are grouped together but Paton (2003) urges caution when discussing characteristics of emergency workers in general arguing that subgroups are not necessarily the same just because of the similarity of their roles and the kinds of incidents they are required to attend. Therefore, it may be more appropriate to investigate each of the professions individually (Wagner, 2005). Subsequent research appears to bear this out and Salters-Pedneault, Ruef, and Orr (2010) examined personality traits of police and firefighter recruits and found that the two groups differed in personality characteristics suggesting that the singular rescue personality as proposed by Michell and Bray (1990) does not exist. Secondly, in Mitchell & colleague's research relatively stable and broad personality traits are intermingled with narrower, more malleable factors such as motivation and recreational behaviour (Klee & Renner, 2013) and it would be more appropriate to use one of the well-established models of personality (Wagner, 2005). Additionally, there is actually very little empirical research examining whether individuals who chose different emergency service careers actually differ from each other or from the general population (Wagner, 2005) and there is some suggestion that the concept may have originated from the authors personal experiences in the field rather than from well-founded empirical research (Gist & Woodall, 1998).

More recent research found no evidence of the existence of the rescue personality as described by Mitchell and Bray (1990) (Wagner, Martin, & McFee, 2009; Salters-Pedneault et al, 2010). However, there is relatively little research in this area as the majority of literature on personality and the emergency services does not compare these populations to non-emergency workers (Klee & Renner, 2013) as investigations tend to centre around personality factors as either predictors of job performance (Niculita, 2013) or post-traumatic impacts (Fabricatore, Azen, Schoentgen, & Snibbe, 1978). Literature has, however suggested, the presence of higher levels of extraversion in emergency services personnel, for example, Hui et al. (2001) found that volunteer rescuers were more extraverted than non-rescuers. More recently, Wagner et al. (2009) investigated the existence of the rescue personality in firefighters, using the Five Factor model of personality (Costa & McCrae, 1992), and found significantly higher levels of extraversion in firefighters when compared with a sample of similar individuals from blue-collar occupations such as mill workers, skilled labourers, professional truck drivers and service technicians. Although researchers tried to ensure that the individuals from both groups were as similar as possible, and did match the groups in terms of the variables such as age, education, marital status and number of children, some of the occupations of the comparison group were in fact sedentary ones, which likely do not involve being exposed to the public. Thus, these two groups may not be as similar as has been suggested as these factors may represent important differences.

However, there are several possible explanations for these findings; for example individuals who have higher levels of self-reported extraversion may be initially attracted to becoming a firefighter as such individuals are more likely to enjoy a high-energy, high-paced environment that necessitates social interaction and includes unpredictable events (Wagner et al, 2009). Alternatively, it may be that this self-reported extraversion is a function of being involved in the highly social environment of the Fire Service including the required teamwork and high degree of stimulation, the requirement to work within this environment may lead firefighters to report the characteristic of extraversion to reduce their cognitive dissonance regarding their choice to complete such tasks (Ibid). It could also be that extraversion is viewed as a valued trait in this environment and therefore results could be explained in terms of the social desirability effect (Ibid). Due to the cross-sectional nature of the research, these findings provide no indication as to whether these differences in extraversion are evident pre-employment (Ibid).

As previously discussed (see 3.3) personality factors appear to have the potential to predict posttraumatic growth with extraversion being the personality trait most consistently associated with growth in the general population (Tedeschi & Calhoun, 1996). In keeping with this, extraversion was also the personality dimension that correlated most strongly with posttraumatic growth in a sample of emergency services workers in research carried out by Shakespeare-Finch et al. (2005). Openness to experience was also related to posttraumatic growth, in this study, whereas neuroticism was not significantly related to posttraumatic growth in either direction (Shakespeare-Finch et al, 2005). Shakespeare-Finch et al. (2005) argue that more research needs to be undertaken in this area, however, as it is yet unclear as to whether a combination of low levels of neuroticism combined with higher levels of extraversion and openness to experience are the most favourable profile for the prediction of posttraumatic growth in emergency service workers, who have experienced a work-related traumatic incident.

Understanding the relationship between posttraumatic growth and personality becomes particularly significant in the realm of the emergency services as personality factors can potentially be used to inform selection procedures (Paton, 2005).

3.14 Conclusion to the Chapter
This chapter has reviewed the dominant current models of posttraumatic growth and shown that together they present a comprehensive view of the process of posttraumatic growth. In reviewing the existing literature, it is clear that there are many possible factors influencing reported growth. However, as the literature review has demonstrated, findings in this area have been somewhat inconsistent, which may at least be partly due to differences in the measures used and the timings employed, composition of the sample and variations in study design (Cho & Park, 2013). Thus, further examination of these relationships is clearly warranted in order to further our understanding of posttraumatic growth in general. However, understanding which of these variables may influence

posttraumatic growth is particularly important within the emergency services as their daily working activities means that they are repeatedly exposed to potentially traumatic events. Furthering our knowledge is vital for the creation of post-trauma interventions, which could assist in maintaining firefighter's well-being, ensuring that they remain in their work role for longer (Armstrong et al, 2014).

Chapter Four: Methodology

4.1 Philosophical Underpinnings of the Research

Pragmatism is the philosophical approach to science that underpins this programme of research. Pragmatism rejects what has been referred to as "the forced choice dichotomy between post-positivism and constructivism" (Creswell & Plano Clark, 2007, p.27) accepting that there are both singular and multiple realities that are open to empirical enquiry. Knowledge is viewed as being both constructed and based on the reality of the world we experience and live in (Johnson & Onwuegbuzie, 2004). Pragmatism has been referred to as an anti-philosophy as it prioritises action over philosophizing (Robson & McCartan, 2016) and concerns itself with solving practical problems in the real world (Creswell & Plano Clark, 2007). In doing so, it calls for the convergence of qualitative and quantitative methods, asserting that they are not in fact different at an epistemological or ontological level, and instead stressing that they share many commonalities in their approach to scientific enquiry (Hanson, 2008). In line with this approach both qualitative and quantitative methods were used to address the research questions posed by this thesis and therefore the assumptions and approaches of both will be explored.

4.2 Overarching Methodology: Mixed Methods Approach

Despite the incompatibility thesis (Howe, 1988), which advocated that qualitative and quantitative research paradigms, including their associated methods cannot and should not be mixed, mixed methods research has developed rapidly in recent years (Denscombe, 2008) and is "now recognised as the third major research approach or research paradigm" (Johnson, Onwuegbuzie, & Turner, 2007, p.112). It has been suggested that researchers who utilise mixed methods approaches are more likely to select methods and approaches with respect to their underlying research questions, rather than with regard to some preconceived ideas about which research paradigm should have dominance in social science research (Johnson & Onwuegbuzie, 2004). Moreover, it has been argued that the use of these approaches will often provide the "most informative, complete, balanced and useful research results" (Johnson et al, 2007, p.129).

According to Denscombe (2008) mixed methods research has four defining characteristics:

- quantitative and qualitative methods within the same research project;
- a research design that clearly specifies the sequencing and priority that is given to the quantitative and qualitative elements of the data collection and analysis;
- an explicit account of the manner in which the quantitative and qualitative aspects of the research relate to each other; and
- pragmatism as the philosophical underpinning of the research

Thus, as can be seen, all of these four characteristics are present within this programme of research. Pragmatism provides the philosophical partner for mixed methods research by

acknowledging the value of both quantitative and qualitative research methods (Feilzer, 2010) and advocating that research methods should be mixed in ways that offer the best opportunities for answering the research question (Johnson & Onwuegbuzie, 2004). Robson (2011) argues that one benefit of pragmatism is that qualitative and quantitative approaches can be used to compliment rather than oppose one another and this can be seen within this programme of research.

Within the mixed methods paradigm a sequential mixed methods design was chosen as the primary focus of this design is to explore a phenomenon and is characterised by the initial phase of qualitative data collection and analysis followed by a phase of quantitative data collection and analysis (Creswell, 2003). Study one used a qualitative approach (grounded theory) to develop a model of posttraumatic growth and then quantitative approaches were used to explore and test this model. This ability to generate and test a grounded theory has been identified as one of the particular strengths of mixed methods research (Johnson & Onwuegbuzie, 2004).

Rossmann and Wilson (1985) identified three benefits of combining qualitative and quantitative research:

- to enable confirmation or corroboration of each other through triangulation
- to enable or to develop analysis in order to provide richer data.
- to initiate new modes of thinking by attending to paradoxes that emerge from the two data sources.

Triangulation is a key underpinning of academic rigour (Johnson et al, 2007). If findings can be corroborated across different approaches greater confidence can be placed in the results (Johnson & Onwuegbuzie, 2004). However, conversely if the findings conflict then the researcher has greater knowledge and can modify interpretations and conclusions accordingly (Ibid). Thus, the aim of using mixed methods may not necessarily be corroboration but could equally be to expand the researchers understanding of the phenomenon being studied (Onwuegbuzie & Leech, 2004). Combining qualitative and quantitative techniques within the same framework can also help to neutralize the limitations of each approach whilst building on their strengths, which again can lead to stronger inferences (Bryman, 2006).

Using a mixed methods approach is also responding to the call from researchers who claim that quantitative methods have been widely replicated in the area of posttraumatic growth and so now mixed methods approaches are needed, which would allow the evaluation of the individuals' subjective reports on the perception of posttraumatic growth after trauma (Ramos & Leal, 2013).

4.3 Qualitative Research Method: Grounded Theory

Glaser and Strauss originally developed grounded theory methods in the 1960's, and their 1967 book, The Discovery of Grounded Theory laid down a set of procedures for the generation of theory from empirical data (Thomas & James, 2006). Grounded theory is an inductive process of data collection (Morse, 2001) in that the researcher has no preconceived ideas to prove or disprove (Ghezeljeh & Emami, 2009). Grounded theory was chosen as the qualitative method in this research as it is the only qualitative method that can be used to generate models of phenomena (Willig, 2008). This thesis seeks to develop a model of posttraumatic growth in Fire and Rescue Service personnel.

Seen as post-positivist in its intent traditional grounded theory is founded on the premise of critical realism (Harris, 2003) with traditional grounded theorists believing in the existence of a 'real' reality but one that can only be imperfectly perceived (Annells, 1997). In the intervening years, researchers have adapted grounded theory methodology to fit with various ontological and epistemological positions (Mills, Bonner, & Francis, 2006). Grounded theory offers a set of guidelines for building conceptual frameworks, which if used as flexible tools rather than rigid rules, offers researchers a broad method with distinct procedures that work in practice (Hallberg, 2006). As such, this method is suitable for pragmatic researchers of all methodological persuasions (Robson & McCartan, 2016).

However, the position taken within this thesis most closely aligns with the constructivist approach, which denies the existence of an object reality, proposing instead that reality is "something constructed in our heads"(Ghezeljeh & Emami, 2009, p.17). A constructivist grounded theory therefore adopts the methods of traditional grounded theory without adhering to its assumptions, instead giving priority to the phenomenon under enquiry and viewing both the data and analysis as being created from shared experiences and relationships with participants (Charmaz, 2006). Thus, in this view both data and analyses are social constructions reflecting what their production entailed and any analysis is contextually situated in time, place, culture and situation (Ibid).

A disputed area within grounded theory is the place of the literature review (Charmaz, 2006). Classic grounded theorists (Glaser & Strauss, 1967) advocate delaying the literature review until the analysis has been completed but this has incurred criticism from other researchers who believe this is naïve and accuse them of espousing pure induction (Bulmer, 1979). Charmaz (2006) recommends delaying the literature review as a way of encouraging the researcher to articulate their own ideas and to avoid importing preconceived ideas onto their work and this was the position taken in this thesis.

Mays and Pope (2000) argue that a clear and detailed account of the process of data collection and analysis is an important method of assessing validity in qualitative research and therefore the analytic method used in study one will now be outlined. The analytic framework used within this thesis was based on the process developed by Strauss and Corbin (1998) beginning with coding the data. Coding is the pivotal link between data

collection and developing theories to explain the data (Charmaz, 2006). Through coding the researcher defines what is happening in the data and begins to understand its meaning (Ibid). As a result, theoretical statements are produced that transcend specific times and places and contextual analysis of actions and events, which constitute the two major threads of, grounded theory (Ibid).

The process of coding undertaken was as follows:

- Firstly initial line-by-line coding, naming each line of the data (Glaser, 1978) was undertaken on each participant's transcript. In line with Charmaz (2006) recommendations, these initial codes remained open-ended but close to the data and used words that reflected action, in an attempt to avoid making conceptual leaps.
- The second phase of the coding process was focused coding and these codes were more directed, selective and conceptual than line-by-line coding (Glaser, 1978). It was in this phase that the most significant or frequent initial codes were used to sort, synthesize, integrate and organize the large amounts of data (Charmaz, 2006). During this phase, decisions are made about which codes make the most analytic sense in categorising the data (Ibid).
- Axial coding was the last stage of coding used and this relates categories to subcategories and specifies the properties and dimensions of a category.

To ensure that all of the participants were given a voice each interview was fully transcribed and coded in line with the above process.

Memo writing is the next step in the analytic process and these allow comparisons and connections in the data to be captured, crystallize questions and directions to pursue (Charmaz, 2006). Written in an informal way memos provide a space for explanation and discovery and are a way of recording what has been seen, heard, sensed and coded (Ibid).

Memo writing therefore, is part of reflexivity and considered to be a very important component of constructivist grounded theory and an indicator of quality in qualitative research (Willig, 2001). Thus, memoing is not only a reflective tool to record the researcher's abstract thinking about the data but also provides the researcher with the opportunity to remember, question, analyse and make meaning about the time spent with the participants and the data that they generated together (Mills, Bonner, & Francis, 2006). Mills, Bonner, and Francis (2006) advocate that thoughts about this process should be articulated on memos during the research process in order to acknowledge the place from which the researcher began as well as their influence in the co-construction of meaning. In line with this recommendation, memos were written throughout the research process, making explicit and critically reflecting on the researchers own underlying assumptions. At the beginning of the research process, the researcher had very little knowledge of the Fire and Rescue Service as she had no previous experience of working in this arena and did not

know any Fire and Rescue Service Personnel. Therefore, the underlying assumptions she did have were due to media exposure. Thus, in the first months of the research programme the researcher sought out opportunities to engage with personnel at as many Fire Stations as possible in order to understand the context in which the research was to be conducted.

Alongside memo- writing, clustering was also undertaken, which allowed a visual representation of what was contained within categories, and how these categories fitted together. This enabled comparisons between participant's experiences and made explicit existing patterns within the data.

Negative case analysis, an important means of countering researcher bias (Robson & McCartan, 2016), was also conducted at all levels of coding and analysis to identify contradictory evidence. Considered invaluable, exploring cases that do not fit the emerging model, challenges the researcher's initial assumptions and categories (Henwood & Pidgeon, 1992) and categories were then disqualified based on this contradictory evidence.

A major strength of grounded theory is its open-endedness and flexibility (Charmaz, 1990). Grounded theory differs from other qualitative approaches in that analysis and data collection are undertaken simultaneously allowing the researcher to follow up on ideas and pursue leads as they develop (Ibid). In line with this the interview schedule did go through a process of evolution and this is charted in chapter five (see 5.3). Thus, merging theoretical categories shape the data collection as well as structuring the analytic process of coding, memo writing and writing the developing theory (Glaser & Strauss, 1967).

Although considered to be the most robust qualitative research methodology (Wu & Beaunae, 2014) the charge of subjectivity has been levelled at the process of qualitative data analysis and is the main critique of grounded theory (Barbour, 2001). Thus, to ensure academic rigour in the development of a robust grounded theory several recommended techniques (in addition to reflexivity and negative case analysis, which have already been discussed) were used throughout the process. Barbour (2001) recommends that independent researchers carry out cross checking of coding strategies and interpretation of the data and this became a core activity of supervision sessions throughout the research in line with this recommendation. These discussions were extremely beneficial in generating possible alternative explanations and encouraged thoroughness in both data analysis and in providing, an account of how the analysis was developed (Barbour, 2001).

Theoretical saturation is one of the primary means of verification in grounded theory (Strauss & Corbin, 1998) and can also be used as an indicator of when to stop gathering data (Charmaz, 2006). Categories are "saturated when gathering fresh data no longer sparks new theoretical insights, nor reveals new properties of the core theoretical categories" (Charmaz, 2006, p.113) and this was reached with the ninth participant in this research.

The process of member checking (Mays & Pope, 2000) was not completed, as the researcher did not return to participants. This was not considered feasible due to pressures on participant's time and geographical distances involved. Additionally the quantitative study would provide an alternative approach to achieve this.

4.4 Qualitative Data Collection

The qualitative phase of the thesis involved face-to-face data collection and according to constructivist grounded theory, interviews provide the site for active interactions between two people, which lead to results that are mutually negotiated, and contextual (Fontana & Frey, 2000). This approach, therefore, is one of data generation as opposed to data collection (Collins, 1998) and is the complete antithesis of what Collins (1998) referred to as the "smash and grab approach" (1.1), in which participants are viewed as data sources and are relieved of whatever useful data they may have. According to Mills et al. (2006) a constructivist approach requires the researcher to create a sense of reciprocity between themselves and the participants and to establish relationships with participants that have an equal balance of power. Several strategies were implemented in an attempt to achieve this:

- Interviews took place at a time and place of the participant's choice.
- Interviews utilised semi-structured interview schedules, which allowed participants to assume more power over the direction of the conversation and explore issues and concerns, which are relevant to them. Active listening was employed throughout.
- Good rapport was established with participants by sharing personal details and answering participant's questions both during and after the interview (O'Connor, 2001).
- The researcher remained cognisant of the need to adopt a non-judgemental stance towards participants and not assign values to participant's responses or even to the participants themselves (Mills et al, 2006).

Using a semi-structured interview schedule also mitigated the main criticism of grounded theory, which is that it is subjective because the researcher decides which questions to ask in the process of data collection (Willig, 2001). By using a semi-structured interview schedule, designed with a conversational tone, participant's perspectives become the focus of the interview with the researcher using prompts and probes to encourage rather than explicitly direct. In designing the interview schedule, key considerations were the research population, the phenomena under investigation and nature of the data sought as outlined by Ritchie and Lewis (2003). Members of the research supervision team were also involved in the process of developing and revising the interview schedule to ensure that there was no inherent bias.

As some of the questions on the interview schedule could be considered sensitive, i.e. those pertaining to engaging in traumatic incidents and experiencing traumatic reactions, face-to-face data collection provided the opportunity to monitor the participant throughout

(Willig, 2001). A number of participants did become distressed during the interview at which stage they were reminded that they were free to pause, withdraw or decline to answer any questions they felt were too sensitive. Face-to-face data collection also provided the opportunity to ensure that the participant was made fully aware of the phenomena being studied and ensured that the participant gave fully informed consent prior to commencement of the interview.

4.5 Quantitative Research Method

The use of qualitative methods enabled the development of a conceptual model of posttraumatic growth within a sample of Fire and Rescue Service personnel. Quantitative methods offered the opportunity to further examine this phenomenon and test whether this model could be generalized from this sample to the wider population of the Fire and Rescue Service.

This progression from using qualitative methods to quantitative methods is consistent with the mixed methods approach and the philosophy of pragmatism underpinning this thesis, which advocates using whichever methodological approach is best suited to answer the research question (Robson & McCartan, 2016). This quantitative approach may appear incompatible with the qualitative approach already taken due to its historical roots in positivism, which emphasises objectivity (Blaikie, 2007). However, Robson (2011) argues that the development of the post-positivist view of research means that the view that these approaches oppose each other is outdated and instead allows the alignment of both qualitative and quantitative methods.

Structural equation modelling was chosen as it provides a comprehensive approach to modelling data that is "well suited for empirical tests of richly detailed, process-orientated models of the human experience" (Hoyle, 2011, p.2). Although other approaches exist, a strictly confirmatory approach was taken, as the aim was to evaluate the degree to which the conceptual model (developed from the grounded theory) accounts for a set of observed relations between variables (Hoyle, 2011). Further details as to the reasons why SEM was chosen for this programme of research and details of the process adopted are provided at the beginning of chapter eight.

4.6 Quantitative Data Collection

An online survey design was used to collect quantitative data. The processes used to select measurement scales and details of the final scale selection are covered in chapter six. Ethical considerations still needed to be observed and fully understood by the participants and thus participant information sheets, debrief sheets were included online and informed consent was obtained. Online data collection afforded benefits in terms of both time, costs to the researcher, and provided the potential for a much wider geographical catchment. It also meant that the questionnaire could be promoted on different forums, thus increasing the potential sample size. Additionally, an online survey was thought to provide the best fit with the working practices and shift systems within the Fire and Rescue Service, as it could

be completed at the convenience of the participant, which it was hoped would help in achieving good response rates.

4.7 Sampling Considerations

A purposive sampling strategy was used to recruit participants in both empirical studies. The only inclusion criteria was that participants were a serving firefighter in the UK Fire and Rescue Service and the term firefighter was used to encompass both whole time and retained firefighters (see 2.2). It was not specified that firefighters had to be operational at the time of participation as until very recently the Fire and Rescue Service had a single tier entry system in which all operational staff began their career as firefighters following their initial training. The ways in which this purposive sampling was achieved for both studies are discussed at the beginning of each empirical chapter (see 5.2 and 7.2 respectively).

In an attempt to ensure academic rigour, sampling aimed to capture as many differences in terms of sex, age, length of service, rank, role and geographical locations as possible.

4.8 Research Ethics

The current study was designed in accordance with the British Psychological Society Code of Human Ethics (BPS, 2009: BPS,2012: BPS, 2014) and all procedures conducted during this research and were approved by the NTU College of Business, Law, and Social Sciences research ethics committee. There were no issues arising.

4.9 Conclusion to Chapter

This chapter has outlined the philosophical underpinnings of this thesis and the methodology used to address the research questions. A sequential mixed methods design enabled the development and testing of a model of posttraumatic growth within this population. The following chapters will report the empirical studies.

Chapter Five: Empirical Study One - Qualitative Study

5.1 Introduction to the Chapter

This chapter charts the development of the grounded theory model of posttraumatic growth, which was the primary aim of this thesis (see 1.2). This theoretical model was developed from the lived experiences of firefighters and sought to examine firefighter's experiences of encountering traumatic events, the coping strategies they used and the resulting negative and positive adaptations. In doing so this addressed a number of the research questions set out at the beginning of the thesis (see 1.3). The main research questions to be addressed centred on the first group of research questions (labelled A) which concern the prevalence and nature of posttraumatic growth in this population and were as follows: is there posttraumatic stress and posttraumatic growth within this population? and can posttraumatic growth exist in the absence of posttraumatic stress?. These were considered as primary questions to address as dominant models of growth suggest that posttraumatic occurs through the process of resolving posttraumatic stress (Joseph, & Linley, 2005). However, further research questions that it was thought could be informed by the development of the model related to whether posttraumatic growth is cumulative or related to a specific event, fleeting or an enduring phenomenon and whether sex differences exist in the experiences of posttraumatic growth as has been suggested by previous research (Tedeschi & Calhoun, 1996). Previous models of growth assert that pre-trauma characteristics play an important role in the development of posttraumatic growth (Tedeschi & Calhoun, 1996) and the third group of research questions (labelled C) centre around the associations between posttraumatic growth and other concepts. Thus, in developing the model of growth it was also hoped to answer questions about the relationships between posttraumatic growth and training, resilience, coping strategies and well-being.

5.2 Methods

Two regional Fire Services in the UK, who had long-term relationships with Nottingham Trent University, were approached to take part in the study. Having secured their agreement a short article was placed on their respective intranets explaining the purpose of the study and inviting members of the Fire and Rescue Service to contact the researcher directly should they wish to take part. The only inclusion criteria was that they were serving members of the UK Fire and Rescue Service because as a profession firefighters are faced with a variety of hazardous events, such as fighting fires, cutting casualties out of vehicles and handling dead bodies, and so have elevated exposure to potentially traumatic events (Armstrong et al, 2014).

Participants

The sample consisted of 12 individuals, 11 males and one female, ranging in age from 25 to 53 (mean age was 43 years) all of whom were serving members of the UK Fire and Rescue Service at the time the data was collected (but not operational at the time of interview necessarily). Table 5.2.1 provides short pen portraits of the participants.

Table 5.2.1

Details of Participants in Study One

Alan	Alan was a 32 years old whole time Firefighter and had 6 years' service in the FRS. He was married and at the time of the interview, his wife was expecting their first child.
Daniel	Daniel was a 44 years old whole time Firefighter and had 18 years' service in the FRS at a number of different stations. He was married and had 2 teenage children.
Marc	Marc was a 47 years old Station Manager, having previously worked as a Firefighter and Crew Manager. He had 22 years' service in the FRS and had spent some time in training roles. He was living with his partner and had one teenage child.
Paul	Paul was a 46 years old Station Manager working in a training role having previously worked as an operational Firefighter, Crew Manager and Watch Manager. He had 25 years' service in the FRS and had worked in several different regions. He was married and had one teenage child.
Jayne	Jayne was a 35 years old whole time Firefighter. She had 8 years' service in the FRS. She lives with her partner.
Toby	Toby was a 25 years old whole time Firefighter. He had 7 years' service in the FRS, some of which was retained service. He had a girlfriend and was living at home with his family.
Jason	Jason was a 48 years old whole time Firefighter and retained Crew Manager. He had 10 years' service in the FRS. He was married and had three teenage children.
Julian	Julian was a 53 years old Watch Manager working in a training role having previously

	worked as an operational Firefighter and Crew Manager at various stations. He had 26 years' service in the FRS some of which was retained service. He was married and had two grown up children.
Billy	Billy was a 43 years old Watch Manager working in a training role having previously worked as an operational Firefighter and Crew Manager in several different regions. He had 24 years' service in the FRS some of which was retained service. He was married and had one teenage child.
Trevor	Trevor was a 44 year old Station Manager. He had 19 years' service in the FRS in both operational and training roles. He was married and has one child.
Simon	Simon was a 46 year old Whole time Firefighter. He had 13 years' service in the FRS some of which was retained service. He is single and has one grown up child.
Digby	Digby was a 47 year old Watch Manager who was working in a training role having previously worked as an operational Firefighter and Crew Manager. He had 23 years' service in the FRS working at a number of different stations. He was married and has a grown up son.

Data Collection

Participants completed the Posttraumatic Diagnostic Scale (PTDS; Foa et al, 1997) and the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) prior to undertaking the interviews. Although the use of quantitative measures could be considered somewhat unusual alongside grounded theory, these were not included for any statistical analysis per se but were intended as a means of checking the qualitative analysis. Critics of the research area have argued that the measurement tools for posttraumatic growth establish a response set that is biased towards positive change by inclusion of only positive items, which could lead to participants over reporting positive changes (Ford et al, 2008). They call for measurement tools of posttraumatic growth to be co-presented with other measures of negative sequelae (Ibid) and therefore, administering these two measures together addressed such criticisms. For the purposes of this study, participants were asked when completing the questionnaires to include only traumatic events that they had experienced as part of their working lives.

Posttraumatic Growth Inventory

The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is the most widely used measure of posttraumatic growth (Ramos & Leal, 2013) and is a 21-item self- report measure of positive outcomes following exposure to a traumatic event. It is scored in the format of a six point Likert scale (0 = I did not experience this change as a result of this event; 5 = I changed to a very great degree as a result of this event) with a potential range of scores from zero to 105, higher scores indicating greater posttraumatic growth. Sample items include "I established a new path for my life", "having compassion for others" and "appreciating each day". The scale consists of five factors: relating to others, spiritual or religious changes, a renewed appreciation of life, personal strength and new possibilities. Higher scores on each of these subscales indicate higher posttraumatic growth in that domain. The posttraumatic growth inventory has strong internal consistency, an alpha coefficient of .90 was reported and the test-retest reliability was .71 (Tedeschi & Calhoun, 1996).

Posttraumatic Diagnostic Scale

The Posttraumatic Diagnostic Scale (PTDS; Foa et al, 1997) is a 49 item self-report measure of posttraumatic stress disorder designed for use in both clinical and research settings. Part one of the questionnaire required participants to identify if they have experienced any of the 12 categories of potentially traumatizing events (for example, accident, fire or explosion). The second part of the questionnaire asked participants to identify which of the events they had experienced concerned them the most, how long ago it occurred, whether they had been injured, whether their or another life was in danger and whether the participant experienced feelings of helplessness or terror. In part three of the questionnaire participants were asked about symptoms in the last month, and rated 17 items on a four point Likert scale (0 = not at all or only one time; 3 = 5 or more times a week/almost always) reflecting the symptoms that correspond to the DSM-IV criteria for Posttraumatic stress disorder. These symptoms were clustered into three sections, re-experiencing, avoidance and arousal. In part four participants were asked to rate the level of impairment caused by their symptoms in nine areas of life functioning (for example work, relationships with friends), within the past month. A diagnosis of posttraumatic stress disorder is only made when a participant endorses at least one re-experiencing, three avoidance and two arousal symptoms (Foa et al, 1997). Symptom severity scores are obtained from adding up the participants responses on selected items and range from 0 – 51 (0 = no rating, 1-10 = mild, 11-20 moderate, 21-35 moderate to severe, 36-51 severe). The Posttraumatic Diagnostic Scale has high internal consistency, an alpha coefficient of .92, a good test-retest reliability is 0.74, (Foa et al, 1997) and good sensitivity (0.82) and specificity (0.77) when compared to diagnoses using structured clinical interviews (Spitzer, Williams, Gibbon, & First, 1990).

Although administering these measures was intended as a means of checking the qualitative analysis the researcher was also cognisant of the possibility of introducing bias into the interviews and the resulting analysis. Therefore, in an attempt to address this, the

completed questionnaires were placed in a sealed envelope following completion by participants and were only opened and scored once the analysis was completed.

Interviews

Semi-structured interviews were selected due to their benefit of allowing participants to fully explore the issues and concerns, which they felt were relevant to the research questions. This fits with the Grounded Theory approach (Charmaz, 2006). An interview schedule was designed to explore participant's traumatic exposure and subsequent reactions and experiences. Figure 5.2.1 details the first interview schedule.

1. Can you start by telling me a bit about yourself please?

- Age, marital status, family and parents occupation, position and length of service overall and in each of their roles.
- If a parent was a firefighter what was it like to live with that?

2. So what's it like being in the FRS?

- What do you feel are the positives and the negatives?
- Can you tell me a bit about what you consider to be your career highlights?

3. According to research, firefighters are sometimes exposed to traumatic events as part of their daily work activities. Could you tell me about such an event that you attended?

- Could you tell me what happened from the time you feel the event started to the point you feel the event concluded?

4. What were your reactions as the event was happening?

- Then just after the event stopped happening
- Then after a few months

5. Please, can you tell me about your feelings at the time the event was happening?

- As you look back on the event now during the interview what are you feelings about the event?

6. Could we just expand for a moment to other incidents, you have spoken about one particular event in some detail. Can you take a little time to tell me a bit about some of the other traumatic incidents that you have attended please?

- Roughly how many traumatic incidents would you say you went to in a year?

7. Please can you tell me about any ways in which you think dealing with traumatic incidents at work has impacted on your life?

- At home – negatively/positively – examples
- At work – negatively/positively – examples
- Development of new/different interests
- Changing priorities/changes in the way you think about life
- Appreciation of life
- Personal strength

8. If you think of your day to day life before you dealt with traumatic incidents in the Fire and Rescue Service, can you describe anything that you do differently now from before?

- If you think about work is there anything that you do differently?

9. Since you have been dealing with traumatic incidents at work do you feel that there have been any changes in your relationships? For good, for bad, either or both…

- With loved ones/family/friends/colleagues
- Are there any differences in the way you relate to people?

10. Please, could you describe to me how you deal with a traumatic incident now?

- How do you deal with the event while you are at it, in attendance?
- What happens after the event to your feelings?
- After the event, how do you deal with the event?

11. Can you describe to me how you remember dealing with traumatic events as a probationer or early career firefighter?

- If you think about the ways you have developed over the course of your firefighting career, do you think you have developed in different ways in response to different traumatic events?
- Could you describe these developments to me please?

12. Do you see yourself as a resilient person?

13. Please, could you tell me what religion and spirituality means to you?

- Have there been any changes in these feelings as a result of your exposure to traumatic incidents?
- Could you describe these changes to me please?
- Is there anything else at all that you would like to add?
- Is there anything that you would like to ask me?

Thank You – participant debrief sheet

Figure 5.2.1 First interview schedule

This interview schedule, detailed in figure 5.2.1, was used with four participants of the first regional Fire and Rescue Service. The interviews were recorded and fully transcribed verbatim. All names of participants, other identifiable individuals, locations and points of reference were changed to pseudonyms in the transcription process to protect the identity of the participants and their organisation. The interviews took approximately one and a half to two hours.

In line with the principles of Grounded Theory, analysis and data collection were undertaken simultaneously (Charmaz, 2006) and once the first four interviews had been completed and transcribed, the data and the interview schedule were examined and the following comments made:

- The schedule appeared somewhat unbalanced in terms of time given to trauma and growth; too much time apportioned to trauma and not enough about potential growth
- Questions pertaining to growth were 'too big' and not clear enough for participants; participants tended to have long pauses and generally needed further prompts, one participant responded to question eight with "my mind is exploding at the moment with all kind of things to talk about".
- It became clear that participants arrived expecting to talk about trauma (despite the fact that the recruitment advert explicitly talked about positive benefits of engaging with trauma) and appeared well rehearsed in talking about this. One participant for example, had written some notes the night before the interview about traumatic incidents he had attended. However, when it came to the questions about growth it appeared that this was not a familiar topic. Perhaps, because of this participants found it difficult to articulate thoughts and opinions about growth in the interview. In addition, the participants appeared to be visibly tiring by the time the questions pertaining to growth were discussed, which tended to be between forty-five minutes to an hour into the interview.

Three strategies were implemented to rectify these problems:

1. Revise interview schedule to shorten the section on trauma and better allow participants to articulate potential growth.
2. E-mail the interview schedule to participants a few days prior to the interview to allow them thinking time beforehand.
3. At the beginning of the interview explain to participants that it would take place in two halves and after completing the questions on trauma suggest a five-minute comfort break. However, it was accepted that this would need to be carefully monitored at the time as to whether the participant was in full flow otherwise the rapport and consequently the richness of data might be sacrificed.

1. Can you start by telling me a bit about yourself please?

- Age, marital status, family and parents occupation, position and length of service overall and in each of their roles.
- If a parent was a firefighter, what was it like to live with that?

2. So, briefly could you spend a few minutes telling me what it is like being in the FRS?

- What do you feel are the positives and the negatives?

3. According to research, firefighters are sometimes exposed to traumatic events as part of their daily work activities. Could you tell me about such an event that you attended?

- Could you tell me what happened from the time you feel the event started to the point you feel the event concluded?

4. What were your feelings as the event was happening?

- Then just after the event stopped happening
- As you look back on the event now during the interview what are your feelings about the event?

5. Could we just expand for a moment to other incidents, you have spoken about one particular event in some detail. Can you take a little time to tell me a bit about some of the other traumatic incidents that you have attended please?

- Roughly how many traumatic incidents would you say you went to in a year?

6. So now, we are going to move focus slightly. I am interested to know if there are any ways in which you think dealing with traumatic incidents at work has impacted on you in different settings. If you think back to when you were first in the job and then compare it to now, I am interested in any changes you can think have happened.

- So firstly, from joining to now have you changed your interests?
- Changing priorities/changes in the way you think about life
- Appreciation of life
- Personal Strength

7. Again if you can think back when you were first in the job and compare it to now I am interested in whether you feel there have been any changes in your relationships with other people?

- At home – with loved ones, family or friends – negatively or positively
- At work – with colleagues – negatively or positively

8. Do you see yourself as a resilient person?

9. Please, could you tell me what religion and spirituality means to you?

- Have there been any changes in these feelings as a result of your exposure to traumatic incidents?
- Could you describe these changes to me please?
- Is there anything else at all that you would like to add?
- Is there anything that you would like to ask me?

Thank You – participant debrief sheet

Figure 5.2.2 Second interview schedule

Ethical Considerations

The research was designed in accordance with the British Psychological Society Code of Human Ethics (BPS, 2014). All appropriate measures were taken to ensure the anonymity of data and confidentiality of personal data. An information sheet was given to participants prior to the interview including an explanation of their withdrawal rights, which was also reiterated at the end of the interview. Participants were debriefed and given debrief sheets which included contact details of the Fire Fighters' Charity helpline in the event of any adverse reaction to participation.

Kvale (2007) argues that interviews are permeated by ethical issues as the production of knowledge depends on the social relationship between the researcher and participant, which in turn rests on the researcher's ability to create a safe space for the participant to recount their experiences. Thus, the researcher has to strike a delicate balance between pursuing knowledge and ethical respect for the integrity of the participant (Kvale, 2007). The sensitive topic of traumatic exposure was at the centre of the research and the study was designed to elicit information about participant's traumatic exposure and subsequent reactions to it, both negative and positive. Therefore, possible harm to participants was a key ethical consideration, through the painful reliving of their experiences. Attempts were made to minimise any possibilities of this by ensuring that the purpose of the study was clearly and explicitly articulated to all the participants, together with exactly what their participation would involve. It was also made clear to participants that they could elect not to answer any question should they wish without providing any reason for this and they could take a break or end the interview at any point. The interview schedule was also sent to participants prior to the interview so they could view the questions that would be covered. However, it was perhaps not surprising that across the interviews it was not uncommon for participants to become visibly upset when recounting incidents they had attended frequently resulting in either tears or signs of anxiety. When this happened, the researcher tried to ensure that the balance of power rested with the participant as it was left up to them to decide whether they wished to take a break, continue with or terminate the interview. For the researcher to take the decision to terminate the interview was considered ethically unsound. Many of the participants also disclosed that it was the first time they had spoken about the incidents they recounted and there were on occasions a suspicion that they may have been using the interview as a therapeutic encounter. It was also made clear to the participants that the interviewer was an academic researcher who had no professional qualifications or experience in therapy of any kind.

5.3 Analysis

Analysis was completed in line with the description provided in chapter four (see 4.3). Five main categories emerged from the analysis with peripheral categories within each of these.

(An over view of the emergent Grounded Theory model of growth is presented in figure 5.3.1)

Figure 5.3.1 Grounded Theory Model of Growth
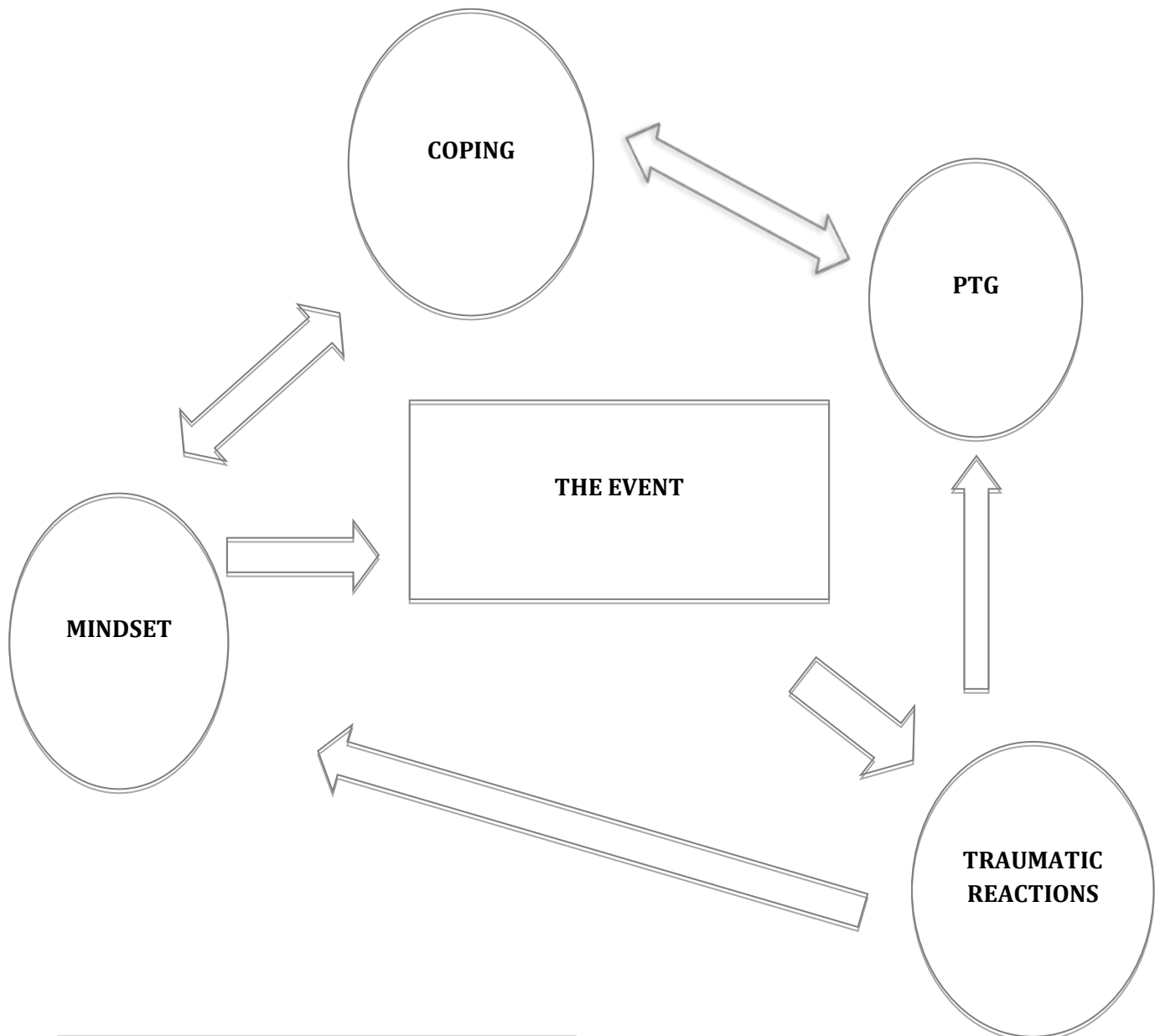
The grounded theory outlined above describes the psychological process that participants went through when attending traumatic incidents, thus enabling them to experience posttraumatic growth.

The core category of 'the event', will be examined first as engagement with a traumatic event could be considered as the starting point of the model.

5.4 The Event

This main category emerged from participant's discussion of an incident, which they had attended and perceived to be traumatic. This appears at the centre of the model and is represented as a square as it is pivotal to the process of posttraumatic growth. It is this engagement with trauma, which potentially can lead to traumatic reactions, which in turn create the potential for posttraumatic growth to occur.

Participants were asked to talk about a traumatic incident, which they had attended, from the time that it began to the time that it finished and in response to this each participant had a particular incident, which they were immediately able to access. What was striking from the data was that in the majority of cases the incident constituted a first for the participant in some way. For the majority of participants the incident constituted their first fatality in the job but for others it was a first of a different sort. For example, for Jason the event constituted the first time that the casualty could have been alive when they arrived but subsequently died. For Digby:

"...that's the first time that I'd had to pick a dead person up and put them in a body bag" (Digby)

and for Toby, the traumatic incident constituted his:

"first kind of exposure to serious trauma...it was the first one where I had to see something" (Toby)

These incidents appeared to represent some kind of light-bulb moment, an epiphany, when individuals were confronted with the reality of what being a firefighter was actually all about as is summed up by Toby's comments:

"I remember staring at it and trying to take in, you know, and kind of just switching off for like ten seconds and thinking, you know, this is what this jobs about and I kind of like, sudden kind of hit me a little bit, you know the excitement went and then it was kind of well this is, you know, these are really bad injuries, this could this be really bad" (Toby)

Very similar language was also used by other participants to describe this moment; Trevor described his most traumatic incident as a "bit of a hit home" and Jason "that sort of hit me a bit"

Although there did not appear to be any specific criteria as to what would make an incident traumatic participants recognised that personalising the incident in some way had the potential to make an incident traumatic for them and therefore represented a threat to their well-being. Incidents, which, participants recalled and often had enduring emotional reactions to, tended to be those that they had personalised in some way. For example, the

incident, which Daniel talks about, involved the death of a baby and coincided with his wife expecting their first child:

"…that will always stick in my mind I think because I have personalised it with this baby that was killed and mine was obviously due to be born….so I think for that reason alone I personalised it and kept it alive if you like…." (Daniel)

Similarly, the incident, which Jayne recalls involved the death of a child who was a similar age to her brother:

"…I think it was because it was young children and I've got a little brother and it's the relation of relating that person this could be my brother you know same age on the way back from a school trip…" (Jayne)

For Trevor feeling empathy for the casualties presents a threat to his own well-being but he acknowledges that as it is the very essence of being human it is difficult to avoid:

"the first thing you're gonna do as a father is, you know – and it's dead wrong, I know it's wrong, you try and think oh my god what it must have been like and what would he have seen and how would he have felt, and again I think that's just part of being a human being"

(Trevor)

5.5 Traumatic Reactions

The core category of traumatic reactions emerged from participant's discussion of the reactions they experienced when attending traumatic incidents. Within the model, the level of these reactions is theorised to affect the subsequent amount of posttraumatic growth experienced. Within this main category are peripheral categories of re-experiencing, anger and avoidance and examination of these will evidence and detail participants experiences and understanding of these reactions.

Whilst all participants readily acknowledged that they had experienced traumatic reactions at some time during their career, the qualitative data suggested that there were significant differences in symptom severity and duration. Some participants became visibly upset during the interview when recalling traumatic events, whilst others attempted to steer the interview away from this, and onto topics they appeared to be much comfortable with discussing, which may have been an attempt to avoid talking about their feelings. One participant, Julian, actually experienced physical reactions during the interview and told the researcher that he had sweaty palms.

Participants generally considered that it was a 'normal' reaction to attending a traumatic incident for the event to occupy one's mind for maybe the first 24 hours afterwards. Often this would be accompanied by irritability and difficulties with sleeping, which participants attributed to having elevated levels of adrenaline. However, they also freely acknowledged

that there were times when they had been particularly upset in the immediate aftermath of a traumatic incident as illustrated by Digby:

"…it had really shook me up to be fair…for a couple of days I was upset to the point where I was in tears. That really badly upset, it really affected me badly…" (Digby)

For most participants this level of reaction tended to be short lived and individuals naturally moved beyond this, using their own coping strategies. However, for some participants, most notably Billy and Simon, traumatic reactions persisted over a longer period:

"I just couldn't get it out of my head; it was constantly in my head all the time…it was probably about a year or more before I started really kind of feeling okay about it…" (Simon)

For Simon the incident only concluded when it was overtaken by a major life event, the break-up of his marriage, which brought with it many changes to his life and consequently other things, which required his focus.

Unlike the other participants Billy and Simon had both attended incidents in which they had perceived the watch (and therefore by implication themselves) had not done the best job that they could have done (for a full discussion on the importance of this see section 5.6 – accepting that bad things happen). Other similarities between these incidents were that they both involved the death of a child and took place when firefighters were on retained duty. It is possible that in these cases being on retained service lessened team cohesion and subsequently meant that the watch was not affording the same level of protection as it generally does for full time firefighters.

Re-experiencing
The sounds and smells that were present at an incident often appeared to form an important part of participant's memories about the traumatic event. Trevor described sounds and smells as tending to "embed themselves" suggesting that they involuntarily become deeply implanted within the individuals and these could act as powerful reminders of the event irrespective of the time that had elapsed since the incident.

Five years after the traumatic incident Billy described that sound is still acting as a trigger:

"I don't have flashbacks to it as such, but you know at the time on the radio was a particular song and you know every time I hear that song or that singer it just reminds me of it." (Billy)

According to Billy, this still regularly happened a couple of times a week.

As participants often had vivid recall of particular smells that had been associated with, traumatic incidents they had attended these too could act as triggers as was the case for Digby, despite the incident having taken place 19 years ago:

"…the smells every time, she's got some perfume on and every time I smell it, it takes me straight back to that job, I have no idea what it is but when I smell it that's it I'm back there on the Saturday afternoon…" (Digby)

Digby believes that the fact that this is still happening is indicative of the fact that for him the event has never concluded.

In a similar vein, Jayne recounted attending an incident involving a fruit and vegetable lorry and every time she walks into her local supermarket the smell of the fruit and vegetables, located just inside the door, involuntarily takes her back to that incident. However, there were differences in how participants understood and dealt with these reactions. Jayne views these triggers as a 'normal' by-product of the job that she does and deals with them by talking about them to whomever she is with at the time she experiences them:

"… whoever I'm with I go God I went to an incident where a fruit and veg lorry went over we cut him out and we did and you start going through it and then obviously if you know the person would be alright with what you are telling them …" (Jayne)

In contrast, Billy perceives that experiencing these reactions is indicative of a psychological problem, which makes him question whether he should seek professional help:

"I don't mind telling you…couple of times a week I hear this particular song or this artist should I say and it just makes me think about it…I know I have been that close thinking I need to go and speak to somebody about this and, you know, I never have, I don't think, but I've been very very close…" (Billy)

Billy acknowledges that thinking about the incident is effectively pointless as it changes nothing but cannot stop himself returning to it. However, unlike Jayne Billy does not speak openly either about the incident or his feelings towards it and has only ever spoken about it to one of his colleague who was also present.

Anger
Some of the participants responded to their traumatic events with anger and in cases where this occurred this emotion was so strong that it could not be contained but instead spilled over despite their best efforts to stop this happening.

Billy reacted to the event he described as traumatic with anger and frustration towards his colleagues about the way that the incident was dealt with but this did not appear to have subsided with the passing of time and instead he reported that it had changed the very essence of the person he is:

"I can say as a fact it made me an angrier person I don't know why I were just so frustrated how ineffective these people were…" (Billy)

91

However, rather than this anger entering all domains of his life (or being directed at his work colleagues) it had predominantly manifested itself in his relationship with his teenage son:

"my teenage son, we have really clashed and I know like I say it doesn't matter I never used to be so angry sometimes I can just flip and I'll shout at him and when you look back you are thinking I've shouted at him over nothing, you know just little things will tip me over the edge" (Billy)

Although Billy acknowledges that his reactions are disproportionate there is a general societal expectation that teenagers will be difficult and exhibit behaviours which are challenging and therefore parents expressions of anger are not unusual. One explanation of this is that his teenage son, therefore, is Billy's only acceptable channel for the expression of his feelings of anger that have remained with him.

Another participant, Paul also expressed intense and enduring anger in response to his most traumatic incident, which involved the death of a young pregnant female resulting from a road traffic accident involving an aggressive drunk driver. Despite occurring 21 years previously Paul became emotionally distressed recalling the incident and broke down in tears. Although the subject of Paul's anger was, actually the drunk driver who was convicted and sent to prison following the incident, the focus of his anger became anyone who consumed alcohol and in particular his wife:

"....over a period of time I think my behaviour had started to deteriorate I'd become very short fuse..let's say from that day on it wasn't conscious decision not to drink… but for a long time I wouldn't touch alcohol it became a sin for me when my wife would like a glass of wine she became I mean I became really horrible to her she was a slut, she was a whore for having alcohol you know I was on a mission almost to stop people ever drinking again…" (Paul)

One of the most potent reminders of the event, for Paul, was the smell of whisky from the drunk driver, which he claimed he could still recall during the interview. It could be that the smell of alcohol on his wife acted as a trigger to the event or that she became the focus of his anger just simply because she was the closest person to him.

Similarly, to Billy, however, the reactions that Paul experienced primarily manifested themselves in his private life and though he acknowledges that his behaviour was unacceptable he sees it something that was beyond his control. Paul's marriage did not survive and although he acknowledges the involvement of other issues, he believes his reactions to the incident were a major factor in the breakdown of the relationship.

As with both Billy and Simon's incident, the event, which Paul describes, took place whilst he was on retained duty. This meant that when the incident was over the firefighters cleaned the kit and went home without any debriefing, either formal or informal, taking

place. Paul directly attributes what he considered extreme emotional reactions to the incident to this lack of debriefing:

"I firmly believe that the problems I had particularly the drinking issue were quite related to this one incident and had I had the opportunity to discuss my feelings and thoughts around the operational environment I would have not gone through what I went through…" (Paul).

Avoidance

There was also evidence of avoidance throughout the data. In some cases, this was a short-term reaction, which enabled individuals to cope in the immediate aftermath of the traumatic event, such as Simon describes following the incident, which involved the death of a child:

"… it was in the paper every week and there is his picture on the front page of the paper so I just stopped going to the garage in the end" (Simon)

Simon was subject to constant reminders of the incident as a campaign was launched following the death of the child, which meant that the event was continually in the paper and on the local TV and radio. In addition to this local people, including his own family members, continued to talk about the event to the point where he could not escape it:

"I think if I'm seeing the little lad in the paper all the time, every time I saw it it just brought it back…and just like you know shut up about it it don't need to be in the paper every week…but because it just kept re-appearing and being stirred up and all this stuff all the time, I think that's probably why it wouldn't go away…" (Simon)

For Simon, at the time, avoiding going to the garage where the papers were sold was the only way he could deal with his feelings about the event.

However, there was also evidence that avoidance persisted beyond the short term and perhaps, rather than a short-term reaction had become a maladaptive coping strategy. The following excerpt from Simon sums up this idea using the metaphor of a box:

"You do develop a little box that you put things in, shut the lid and then you that's it it's gone. You know it's there and sometimes you can open the lid and have a look and it's still there … but it doesn't have any effect on you whatsoever… you know you're completely cold to it" (Simon)

This idea of locking something away resonated throughout other participant's accounts, Trevor also talks about locking "it" away but rather than putting it in a box he locks it away "somewhere inside himself". Although participants did not expressly articulate what was meant by "it" the context around it suggest that they are referring to the individual's feelings and emotional reactions to what they have witnessed and experienced. It appeared

that participants thought emotions could be locked inside the individual and remain undisturbed providing they are not accessed. This is evidenced by Billy's reluctance to share his experiences with his wife (detailed in section 5.6, talking to loved ones within the category of coping).

Jayne also expresses the idea of avoidance albeit in slightly different language but again the phrase coming back up suggests that events have been buried:

"… now that I'm talking about it these jobs are coming back to me which I've probably blocked out for so long but they are coming back up… its funny its strange how you block them…" (Jayne)

Participants seemed to favour this way of dealing with events and their subsequent emotional reactions over the alternative, which appeared to be getting upset, something participants tended to appraise negatively:

"To be honest its I don't like getting upset… but I think it's one of those things where you know I lock it away…" (Trevor)

Jayne was the only participant who expressed the opposite belief, which was that not showing any emotion at all could be an unhelpful strategy, which could potentially negatively affect well-being:

"I do think that whole showing that I'm not bothered helped lead to the fall that I took and now after I can relate back and think actually I never showed any emotion and I never dealt with things where now I can cry at a drop of a hat but it is a way of releasing my emotion you know it I realise now that I've got to do that…." (Jayne)

Jayne equates dealing with things to the release of emotion and the fall Jayne refers to is a period of time when she was suffering with anxiety and panic attacks, which resulted in her having time off work and receiving psychological help for these issues. She was also the only participant who appeared to be comfortable with and talked about displaying emotion in such an overt way.

5.6 Coping
The main category of coping emerged from seven peripheral categories, which reflected strategies that participants utilised when attending traumatic incidents as part of their work within the Fire and Rescue Service.

Being Absent in the Moment
Participants frequently talked about experiencing initial feelings of apprehension, nervousness and dread on the way to incidents followed by feelings of shock when they arrive at a traumatic incident. Although these could be considered normal human reactions

when dealing with traumatic events as members of the Fire and Rescue Service they have to develop a way of dealing with these feelings so that they do not impact on their ability to effect the rescue. It would appear that one of the ways in which they do this is to develop two different personas. All of the participants articulated this idea albeit in slightly different ways; one participant described switching between a home mode and a work mode, others talked about being in the zone or getting one's game face on whilst several participants talked about switching to auto pilot mode:

 "I think we get into….. whether it's like stealth mode, I'm not sure, whether it is like an undercover mode, whether we take that picture away, put it over there until we get time to reflect on it" (Julian)

Adopting this different persona allows the physical rescue to take place on a non-emotional level and enabled participants to be totally focused on the task in hand, often focusing entirely on the equipment they are using. Although the time it takes to get to the incident allows for some mental preparation, the data suggests that it is physically putting on the fire kit that enables this switching to a different persona:

"When I turn out as an operational fire officer or firefighter I've got my superman cape on it's the only way I can describe it when I put my kit on I'm a totally different character" (Paul)

According to Paul, the fire kit has a transformative power, affording the wearer an additional layer of protection, the superhero analogy suggesting strength and courage and possibly a lack of emotion all of which were perceived as being required in order to carry out an effective rescue. A very similar metaphor was used by Simon who referred to his uniform as 'a shield of steel'.

It is only when the rescue is complete that the cognitive processing of what has been witnessed can begin. Taking the fire kit off signals the end of an incident and the release of emotion, which, thus far, has been carefully contained:

"I can remember taking my fire kit off and thinking phew, wow, you know a release of … emotion I suppose and then that's when you start taking it in, I think that's when you start thinking about what you've just witnessed" (Julian)

Being in autopilot mode enables firefighters to manage emotion down, necessary because as Digby explains firefighters reacting emotionally at the scene would pose a threat to the success of the rescue:

"…so you've just got to get on with it. If you stop and start messing about then somebody's going to be going downhill … so you've got to get on with it." (Digby)

Thus, the cognitive processing can only be allowed to begin once the incident has reached a successful conclusion because once this begins firefighters also start to engage with the emotional component of what they have experienced:

"…then I suppose it hits you later when you suddenly … you know the full realisation of the incident hits you and it's your body's mechanism I suppose of letting go, I don't know and everybody releases … different emotions in different ways … " (Digby)

Reflecting on incidents, which they perceived as traumatic, participants frequently talked about a surreal feeling to the experience accompanied by the feeling that time had slowed down. It was noticeable that the language used throughout the data was indicative of an automaticity of process as illustrated by Jayne describing the loading of casualties onto the ambulances:

" …. So again, it is just autopilot, you are trained in it you know what you are doing and you just get on with it and it is like next, next, next it is like load and go, load and go, load and go.. " (Jayne)

Talking
The use of talking as a coping strategy was a pervasive theme throughout the data and encompassed both talking to colleagues and talking to loved ones. This peripheral category was further sub divided into talking to colleagues and talking to loved ones as these appeared to reflect different processes. Whereas talking to colleagues appeared to be, a reciprocal process actually representing social support talking to loved ones appeared to be much more of a one-way process, which participants were using to externalise their experiences.

Talking to colleagues

Talking together as a watch, after returning from a traumatic incident, is one of the usual coping strategies employed by firefighters and there was evidence of this in all of the participants' data. Although formal debriefing procedures exist, this kind of talking was more informal and was a way of accessing mutual support, which, participants identified as their preferred coping strategy:

"I've mainly cope with my mates…so if I need someone to talk to I'd talk to my crew…as a coping mechanism it's a bit of a brotherhood…we always talk. We talk about everything….You know we all do the same it's a give and take you know what I mean. Its good it's the best job I have ever been in for that…." (Jason).

Jason's comments underscore the importance of these close co-worker relations; providing a fully supportive and reciprocal environment in which fellow watch members are perceived not only as friends but akin to family members and again this idea of the fictive family was

common in all participants' accounts. It was notable throughout all participants' accounts when recalling incidents they had attended they primarily used the word 'we', identifying themselves as part of the watch first and an individual second. This type of informal debriefing was very often reported to take place over a cup of tea and it could be that in these circumstances the tea was acting as a cognitive distractor.

However, despite this idea of talking to their fellow watch members as a means of coping, running throughout participant's accounts, exactly what they talked about was never specifically articulated. A common phrase that participants used was that 'we talked about it' but what constituted the 'it' was never explicitly demonstrated. Thus, despite Jason's insistence that they talk about 'everything' it was not entirely clear if they talk explicitly about their innermost feelings or emotional reactions to an incident or if this is in fact something that remains hidden even from their fellow watch members.

<u>Talking to loved ones</u>

The idea of talking to loved ones as a way of 'getting things off your chest' (a phrase that was used in several participants accounts), was also prevalent throughout the data but there was a good deal of variability in participants accounts of just how much they disclosed to significant others, which may be related to their length of service. For example, Alan was considered relatively inexperienced with six years' service and described himself as 'not much of a person to talk about feelings' but articulated the need to talk about incidents he had experienced when he gets home:

"When I get home I'll probably like seek out speaking to somebody you know because I think I have realised that is what personally I probably want to do yeah so just speak about it and get it …off your chest maybe a little bit" (Alan)

However, for the majority of participants, as they progressed through their career it appeared that talking to loved ones became less about debriefing and more in the way of a temperature check, letting loved ones know that they had had a bad day, as a way of accounting for being moody or quiet:

"I think I've adopted a pattern where I would always let my wife know that I'd had a bad day but wouldn't go into detail….." (Paul)

The idea that partners were told as much as their firefighters thought that they 'needed to know' was prevalent throughout participant's accounts.

Thus more experienced firefighters, reported that talking to loved ones had lessened over their careers. This was illustrated by Julian's comments, a firefighter who had 26 years' service at the time of the interview:

"…you start to slow down on the information you pass on … (in the beginning) that was probably getting it off my chest as well. But then I don't think its long before you are

97

thinking I might be putting a burden onto someone else… you know and so I think you do change." (Julian)

This idea of needing to protect loved ones from the trauma to which participants themselves are exposed was echoed through other participants' accounts. This concern was also extended to the researcher with several participants asking if she was ok to talk about, what Digby referred to as 'horrible things' before answering a question. However, whether the need to offload actually diminishes as length of service increases, and presumably, cumulative exposure to traumatic events occurs, was never fully articulated.

Although participants explicitly and often repeatedly spoke about their desire to protect loved ones there was also the implicit suggestion that not sharing with loved ones may also be a strategy to protect their own well-being, as there were clearly perceived risks attached to emotional expression:

"I wouldn't put that burden onto somebody because then their emotions could be strong enough to say, you need to go and see somebody that's not right. Their emotions would probably run away with them….so her emotions would come to the forefront whereas I don't really want that because I've got that picture but that's back here and I don't really want her to have that picture to bring it up, bring it up…" (Julian)

Once again, there is the suggestion that emotion needs to be carefully contained in order to protect one's own well-being and non-disclosure is a way of enabling this. Julian perceives that he cannot trust that his wife (who is not a firefighter and therefore not well rehearsed in managing and containing emotion) is able to do that. By talking to her, he runs the risk of stirring up his own emotions, which he has successfully managed to contain by putting the picture he has of the event to the back of his mind.

Billy too perceives that talking to his wife would have resulted in the expression of emotion, which he prefers to keep hidden:

"… I won't go into detail because…well that one in particular I think had I spoken about it I'd have probably broke down a little bit…I'm not saying there is anything wrong with it but it's just not my choice I prefer not to…" (Billy)

However, for participants who did use talking to their loved ones as a coping strategy, when this strategy was disrupted by the need to protect them, this had long-term consequences, which was the case with Daniel:

"I can remember how upset I got not at the time, it was the aftermath trying to cope on my own…I think I was trying to protect other people…if circumstances had been different at home…I would have gone home and I would have offloaded everything to my wife and that would have been it…" (Daniel)

Domestic circumstances meant that Daniel was not able to talk to his wife about, what was for him, a particularly traumatic incident and consequently he remained upset by what had happened for a long period afterwards. Although he was not visibly upset whilst recounting the event he had thought that he might be and he reported getting, what he described as 'little pangs of emotional wellbeing', despite the incident occurring approximately 18 years previous.

As, in the majority of cases, talking to loved ones represented participants externalising their experiences this did not always actually even necessitate involvement from another human being as was evidenced by Jayne:

"…that's why my dog was great because I'd tell him stuff and you know he was like my rock…he was part of my coping mechanism" (Jayne)

Turning negatives into positives
It was apparent from participant's accounts that the ethos of the Fire and Rescue Service is very much one of personal development and continuous improvement as summed up by Billy, talking about the aftermath of incidents he has attended:

"It's always what we could have done better, you know, what would we do next time. Every days a learning day, don't matter how long you've been in… five years, ten years, twenty years, it doesn't matter, every day is a, we always learn something new…" (Billy).

Thus, participants (irrespective of their length of service or experience) tended to appraise every incident they attended as a learning experience, which, enabled them to turn negative experiences into positive ones. One participant articulated this as a conscious coping strategy that he uses:

"I think it is part of my coping mechanism as well, trying to turn negative into a positive" (Trevor)

Thus, according to this mind-set no incidents can ever be entirely negative experiences, as illustrated by Jason recounting an incident in which a motorbike rider dies:

"…so it's a good example, it's still an example to others now… well we did learn summat about, from that experience, in that you don't try and shock anybody laying in petrol." (Jason)

Although the outcome of the incident was ultimately negative in that someone died Jason categorises it as good because he has taken something from it which he is able to use when upskilling colleagues on first responder refresher training. Thus, using this strategy enabled participants to focus on the future and in doing so negate any negative emotions that may have resulted from attending the incident.

99

Whilst this strategy appeared to be irrespective of length of service it also appeared to be irrespective of role and was used by, participants further up the management chain albeit with a slightly different emphasis. This is illustrated by Trevor's comment who was a Station Manager at the time of interview:

"I just try and look on the positive side of it I'm fortunate enough to have seen so much that nobody should see but I try and make it…turn that into making me a better manager" (Trevor)

However, although participants spoke about using their experiences in a constructive way to aid their own development there was also a suggestion that this constant critiquing, self-evaluation and search for improvement could be providing an alternative mental focus and actually represented another means of avoiding dealing with his emotional reactions to the event. Trevor talks about driving home from incidents in the following terms:

"I'm thinking about stuff and I cannot be concentrating on the road and I must go home on auto-pilot…… I tend to fill my mind with stuff to think about as opposed to dwelling on what the scene is that I've been to… And I think there's only really been – there's been that incident that I talked about at the start of this process that I really did dwell into that and that's probably why I don't do it as much now" (Trevor)

This appears to represent a continuation of being absent in the moment, which firefighters articulated during the actual rescue. The incident which Trevor refers to happened 18 years previously but still emotionally impacts him and resulting in tears during the interview. He became visibly upset almost as soon as he started recounting the event, apologising to the researching and saying that he does not talk about it a lot. Trevor believes that dwelling on the picture is a threat to his well-being as doing so leads to emotional reactions, perceived as a negative. However, focusing on 'stuff', the physical rescue in terms of what had been done and what could be improved upon next time allows no time and space for this and therefore, is also a way of protecting his well-being.

Thus, whilst this process of positive re-appraisal forces individuals to confront what happened at the incident it appeared that this was being done on a non-emotional level and therefore, actually enabled participants to maintain emotional distance from the incident.

Accepting that bad things happen

This category was comprised of peripheral categories of guilt, which participants experienced and had to come to terms with in order that they could move beyond this to reach the second peripheral category and the ultimate goal, which was acceptance.

<u>Guilt</u>

It was clear from the data that the participant's occupational identities were very closely linked to their role as rescuer and a strong sense of pride in being a member of the Fire and Rescue Service pervaded all the transcripts. Therefore, it is perhaps not surprising that some of the participants expressed feelings of guilt, a common reaction to traumatic incidents:

"…in this job if somebody dies … it's your job to save people and if you don't manage it you always feel a bit guilty until you've done enough of it and then you kind of switch off I think… because you know, you come to terms with the fact that you can't save everybody…" (Simon)

Although Simon acknowledges feelings of guilt, he also recognises the reality of the world in which they operate a world where accidents happen and it is not possible to save every casualty that you attend. There is no indication of how much constitutes 'enough of it', perhaps this is different for all firefighters but what is shared is that in order to be effective and efficient in their rescue role firefighters have to arrive at an acceptance of this. Again, as the excerpt from Billy illustrates, although this may be difficult, it is a journey that all firefighters have to make:

"I would probably say that when you're new and shiny it's hard to accept that we can't save everybody…You know I'm not tough as nails that if I went out to a fatality this afternoon thinking oh shit happens, I'm not like that I'm not that insensitive, but it doesn't bother me, I have to accept that it is part of our job, part of our role and we just need to deal with it…" (Billy)

<u>Acceptance</u>

Acceptance appeared to be part of a shared mind-set and was a necessary pre-requisite to preserving firefighter's well-being. Presumably, firefighters who are unable to reach this point leave the service, which may be why there was complete homogeneity in the way participants talked about this.

Acceptance, however, was easier if participants felt that they had done the best job that they could and this idea of doing ones best was a prevalent theme throughout all of the transcripts. When participants perceived the watch as functioning well and doing the best job that they could death was very clearly attributed to the casualty's injuries as Daniel's comments suggest:

"The fact that he died…he'll have died because of his injuries that he may have sustained it won't have been the fact that nobody had helped him" (Daniel)

Participants frequently pointed out that the fact that they were on the scene maximised the chances of survival for the casualty. Team working and interdependence of the watch can again be seen to be performing a protective function as it aided acceptance and meant that personal responsibility was negated:

"… and afterwards I don't reflect and I don't beat myself up or dismiss what I've done or because everything we do is done in a team and we all do things together…" (Daniel)

However, there were a couple of examples within the data of incidents where participants felt that the individuals involved did not do their best and the team did not function effectively. As a result, these firefighters struggled to reach an acceptance of what had happened and perhaps it was because of this, or at least this may have been a contributory factor in them experiencing some of the most severe and enduring traumatic reactions seen within the data (discussed in more detail in section 5.5 traumatic reactions). As the following extract illustrates Billy was involved in such an incident:

"But I were just so angry… first of all I wish that I'd have been wearing breathing apparatus because they didn't do the job properly… the junior officer gave no directional instruction to anybody and I just felt they made a hash of it, we made such a hash of it…I'm not saying for one moment it would have changed the outcome but…there was a massive delay in them getting inside the building… again I accept the kid had already died at that point but we didn't do our jobs properly … I've been to multiple fatalities and it didn't bother me…" (Billy)

As much as identification with the team can be seen as having a protective function, in this instance it becomes a negative as Billy assumes collective responsibility, although he does not perceive that personally he did anything wrong. The incident occurred when Billy already had approximately 20 years' service in the FRS and he was still struggling to come to terms with it despite it happening almost five years before the interviews took place.

Acceptance appeared to be more difficult to reach with incidents, which either involved children or those which could not be attributed to a particular reason and were therefore, unexplainable. Daniel demonstrates the link between the categories of acceptance and talking:

"… for me purely I must have some sort of mechanism where I just either accept it and get on with it and if I don't accept it and I will talk to people…" (Daniel)

Talking about the event enables Daniel to make sense of what happened and therefore, accept it, which he realises is essential if he is to carry on as a firefighter.

Avoiding a personal connection

Participants perceived that making a personal connection with a casualty had the potential to make the incident traumatic for them and therefore represented a threat to their well-being. Thus, as Daniel describes many firefighters are much more comfortable with executing the physical side of the rescue than dealing with casualties:

"… when they realised there was a girl in the back of the car stuck they were fighting to get all of the hydraulic equipment gear so they could use it rather than have to come face with a potential casualty …" (Daniel)

Focusing on the equipment and the technical side of the rescue gives firefighters a means of maintaining emotional detachment from the casualty.

However, Daniel describes himself as unique, and he is indeed unique within this sample. This uniqueness comes from his ability to connect with another human being during an incident, the ease with which he does this and the fact that he is able to do this without it negatively affecting his own well-being and as such, he represents a negative case analysis:

" I think that puts me in a bit of a unique position because I can then well I do I offer any support that they need and I reassure them you know I've got no problem with taking my gloves off and holding someone's hand….I'm quite comfortable asking questions about how people feel…" (Daniel)

In taking off his glove Daniel is removing a barrier between himself and the casualty and if the uniform is affording protection as suggested in the previous category, 'being absent in the moment' potentially removing a layer of protection from himself but unlike other participants he has no fear in doing so.

For other participants, such as Jason being directly involved with the casualty was what made the incident traumatic for him:

"She was alive , talking then the next thing I know she's dead…so it is more direct link, you've spoke to the person…I were there and I witnessed it and I spoke to her and I helped her get in the ambulance… so yeah that's the direct link to the person as opposed to a body…" (Jason)

Conversely, participants appeared to be able to deal with dead bodies, even when they had been badly disfigured, with relative ease.

Some participants also described casualties using language that could be considered as cold and emotionless and which at times, could almost be seen as bordering on disrespectful. For example, Digby used the phrase 'like a human kebab' to describe a girl that had been impaled, her boyfriend 'broken every bone in his body just like a bag of jelly' and referred to the skull of one casualty as 'smashed like an Easter egg'. Again one explanation for this use

of dehumanising language is that it represented another way of distancing themselves emotionally from the casualties.

Blanking out faces emerged as a peripheral category within avoiding a personal connection as this appeared to be a specific strategy which some participants used to avoid connecting with a casualty.

<u>Blanking out faces</u>

Participants were asked to talk about a traumatic event that they had attended and in all cases, there was a particular incident, which participants were able to immediately recall. Participant's accounts of these incidents tended to be very detailed regardless of the amount of time that had passed since the event, often including specific times, weather conditions, sights and sounds, their specific role in the rescue and that of their teammates. However, whilst participants were able to paint a vivid picture of the incident it became apparent that not all could recall the faces of the casualties and Jayne identified avoiding faces as a conscious coping strategy that she uses:

"When I know that it's a fatality I have little systems that I go through to protect myself um in the way I never look at their face" (Jayne)

Talking about an incident where a man was crushed by a car falling on his chest she recalls:

"The one thing I didn't do out of the whole of that job is I didn't look at his face I couldn't tell you what he looked like….I am just looking doing CPR looking down on his feet and that's one of my coping mechanisms it's just don't look at the face which is…it works its worked for me anyway that is something that you can't get out of your head." (Jayne)

Not looking at the casualties face meant that Jayne could not relate to the casualty personally and therefore enabled her to carry out her responsibilities professionally and effectively without allowing emotion to intrude and potentially risk her own well-being.

Questioning other participants' it became clear that the faces of casualties was something that was often missing from their accounts of an incident. However, unlike Jayne, it appeared that some participants were looking at the faces but not retaining these images. Alan, for example, alludes to having a photographic memory, which enables excellent recall of incidents; however, he is unable to remember the casualties face:

"…there are little bits of it that you can't remember like the blokes face even though I was looking at him and holding his head it is almost like things you have sort of maybe blanked out" (Alan)

and Julian was unable to describe the faces of any of the casualties involved in the incidents he had described:

"I don't know any faces…I can paint you a picture but I couldn't put a face on it…I've got no faces…I can't put a face to anybody. That's freaked me out a bit actually. That is weird…" (Julian)

Suggesting that whilst this is a conscious coping strategy that Jayne uses, other firefighters may be doing this unconsciously.

One explanation of this is that facial features contain personal information and participants are either deliberately avoiding them or subsequently blocking them out in order to avoid making a personal connection with the casualty, which they perceive could make an incident traumatic.

Although this did resonate throughout the majority of participant's accounts, not all participants used this as a coping strategy and in contrast, firefighters appeared to actively use the information contained in the faces of colleagues to assess what was happening at the incident. For example, Trevor, in his role as incident commander, actively used the information that was contained in the faces that he saw, often to inform his dynamic risk assessment. Recalling an incident in which a firefighter, under his command passed out, he comments:

"looking at him I looked in his eyes and he was embarrassed … you tell me how you feel, and I could see in his eyes that he was alright…" (Trevor)

Humour
All participants identified humour, often termed "banter" as part of the ethos of the Fire and Rescue Service and a way of interacting with colleagues. No one was immune from this "banter" and no subject was off limits. This use of humour, and in particular black or gallows humour, was also identified as a way of coping with traumatic incidents:

"….but it helps to, without making light of the fact somebody's lost somebody and somebody's lost their life, it's just for me a coping mechanism" (Trevor)

Participants indicated that once the incident had been dealt with they would point out aspects of the event, which they found silly or humorous, as a way of lightening the mood. One participant described this as being part of the debriefing process. However, the use of humour during the incident was also evidenced with firefighters using it as a means of distraction and a way of negating emotional reactions as described by Simon:

"You try and find something amusing out of it, you know if somebody goes white or something, you know you try and find… you take the mickey out of them and just try and lighten the mood" (Simon)

There were occasions, however, when this could not be utilised as a coping strategy and several participants described incidents, which were perceived by the watch as so horrific that no one attempted to make jokes about it. In these instances, participants spoke about it being unusually quiet on the way back to the station and the incidents that participants described where this happened tended to be ones that involved children.

Alcohol
Alan was the only participant that directly articulated the use of alcohol as a means of coping with traumatic incidents that he had attended as the following excerpt illustrates:

"…maybe you feel like you need to maybe have a couple of drinks or something you know like not like a big massive you know binge drink maybe a couple just to relax you a bit" (Alan)

However, other participants did acknowledge the existence of a drinking culture within the Fire and Rescue Service:

"You'll be surprised how many finish a shift and sink into a bottle of wine or anything else you know because there's a lot of people drink and it is a culture …" (Jayne)

5.7 Mindset
The core category of mindset that emerged from the data represents the psychological positioning of an individual.

Running throughout the data was the suggestion that members of the Fire and Rescue Service share a common mindset and Digby's comments articulate what is meant by this:

"…people have got to be a similar sort of…similar sort of sense of humour or abilities, intelligence, their outlook on life….everybody is different but I suppose people are a lot similar in this job than they realise…you have got to have a certain outlook or a view on things I suppose…" (Digby)

Julian described firefighters as having 'quite a funny frame of mind' suggesting that there is something about the way they think which sets them apart from the general population.

Changing Behaviours
Participants reported that working in the Fire and Rescue Service had afforded them an increased awareness of risk, (referred to by Digby as "hazard perception"), which in turn had, for many, resulted in some changes in their normal daily routines. Although the majority of participants exhibited this to some degree there appeared to be a continuum with participants lying at different points along it. For several participants this change manifested itself in being more cautious in areas such things as driving and double-checking

106

electrical appliances were turned off before leaving the house. The following excerpt from Jason was typical of the types of behaviour that were exhibited:

"So last thing at night I'll check the stairs are clear so nobody goes running down because the house is on fire and trips up and that's what I'm doing and that the doors locked but the keys next to the door so if they get down there they are not going to die of smoke inhalation because you can't open the door" (Jason)

Thus, behaviours exhibited by participants in their personal lives centred on minimising risk and being prepared and were often focused on protecting loved ones as well as themselves. However, some participants extended this to conducting a dynamic risk assessment in every situation, they encountered as the following excerpt illustrates:

"when my shift's over, I can switch off really easily, and we can go out and have a good time but I'll still, I will annoy her (his girlfriend), you know, we'll go out for a music gig and I'll walk in and I'll be going right, just know that's your nearest exit there…. And is that because you find often say people have gone out to a music gig, they go in through this big main entrance and then they're watching the gig and then if something bad happens they're first going to think, is to go out the way they come in, through that big main entrance and they end up bottle necking and there's been some really bad incidents…." (Toby)

Contrary to Toby's claims that he can switch off from work really easily the excerpt seems to suggest that actually this spillover from work into personal life is something that is automatic, ever present and therefore cannot be switched off.

For other participants, however, this was not something that they just did for themselves or their loved ones but also extended to the protection of the wider world. Participants spoke about being involved in a good deal of preventative work, within their normal daily routines, such as fitting fire alarms. Although Jason describes this part of his role as one of an educator the language that he uses is almost evangelical, commenting that they 'preach to people' suggesting that this is not merely a job but more akin to a vocation. Thus, given this depth of commitment, it is perhaps not surprising that these behaviours were not solely confined to the workplace. Jayne, for example, describes herself as "Mrs Ultra Health and Safety Officer" and as such takes every opportunity she can to reduce or remove risk for everyone, whenever and wherever:

"if I see something in the street if I see a bin over in the street I pick it up If I see something that could cause harm I move it… But it is stuck in you it is (laughs) its things that you look for" (Jayne)

Although Jayne acknowledges that this behaviour annoys her friends and family she now views it as being a part of who she is, a compulsion, and later in the interview she compares it to having Obsessive Compulsive Disorder (OCD).

The rescue part of firefighters work is reactive and involves events over which firefighters have very little control. One explanation of these behaviours is that they represent an attempt to re-balance this lack of control by controlling as many other aspects of their life as they can.

Resilience

All of the participants identified themselves as resilient individuals and felt that this was a pre-requisite for employment as a firefighter and particularly important for those who wanted to progress within the Fire and Rescue Service. Resilience was frequently described in terms of nature and nurture as participants articulated the belief that resilience was both an individual characteristic, described by Julian as something "that's obviously inside of you" but also something that was fostered by the training, provided by the organisation, as summed up by Daniel:

"… so resilient I think yeah… because I've got the tools of which I can do something about as in I've been trained … " (Daniel)

The fact that all participants had similar views and expressed them in similar ways may suggest that only individuals who exhibit a certain level of resilience either join the FRS or alternatively remain in the job.

Training/Work preparedness

Participants were unequivocal in their praise for the training they received in the Fire and Rescue Service, which they felt was very good. Unlike other populations for whom traumatic events are often sudden and unexpected as a member of the Fire and Rescue service there is an expectation that you will have to deal with incidents, which are potentially traumatic. However, Toby's comments suggest that expectation does not necessarily equate to preparation:

"There is an expectation of it, you know it is coming but you don't know when it's coming. You know you kind of finish training and you know that this stuff happens in real life and you know that it's going to come … but at the same having absolutely no idea what to expect. Expecting its coming but not knowing what is coming… So it's that weather man saying the weather is going be really magnificent today, but you don't know whether it's going to be really hot, you just know it's going to be magnificent…." (Toby)

Participants shared the view that nothing could actually fully prepare you for what you would have to deal with as an operational firefighter and whilst the training was in fact very good at preparing individuals for the technical side of the rescue mentally and emotionally, you could and never would never be prepared for it:

108

"I was prepared …technique wise because I was able, I would have been able to, if they were trapped and we could have used the cutting kit, we're first aid trained…so in that aspect I was prepared. But mentally…you're not" (Digby)

The benefit of accruing experience was a theme that heavily pervaded all of the transcripts. However, the accumulation of experience was not just related to improvements in firefighter's ability to execute the physical rescue but also to a reduction in the intensity of the emotional reactions they experienced, which was considered just as crucial to the outcome of the rescue. This is summed up by the following excerpt from Alan:

"… again the more experience you have got I would say your feelings are like less intense you know what I mean like whatever you are feeling isn't as bad as maybe what you felt the first one you went to you know because it was a bit like panic … you maybe get those feelings again but it is just less because you have used the experience from the first one and the second one and the third one… " (Alan)

5.8 Posttraumatic Growth
The five-factor model of posttraumatic growth, identified by Tedeschi and Calhoun (1996), is the most widely used in this field of research (Shakespeare-Finch & Martinek, 2013).Therefore, this was used as a starting point to categorise participant's reports of growth.

Increased personal strength
Participants reported that being in the Fire and Rescue Service had afforded them the opportunity to gain more life experience and consequently they felt that they were less sheltered. All reported increases in personal strength during their time in the service and Julian related this to dealing with traumatic events:

"…dealing with trauma… I think it does make you a stronger person" (Julian)

Increases in personal strength was often seen as synonymous with increases in confidence and greater feelings of self-reliance as summed up by Alan:

"I'd definitely say more able to deal with things I think when you have seen that yeah like almost like the worst case scenarios of really bad things yeah I think it does make you... feel like I'm I don't know more confident or more .... yeah better to deal with things… " (Alan)

For most trauma-exposed populations the old adage 'what doesn't kill us makes us stronger' goes untested because generally they do not experience repeated exposure. However, the daily working lives of firefighters necessitates this potential re-exposure and therefore they have to deal with similar types of incidents repeatedly. Participants spoke of the Fire and Rescue Service as an organisation in which learning, development, continuous improvement was actively encouraged, and the idea of doing ones best and improving ones performance

was a pervasive theme throughout the data. Thus, for some participants being 'more able to deal with things' translated to incidents they attended whilst on duty and allowed them to perform their role more effectively, whereas for others this increased ability to deal with problems had a wider focus and spilled over into their personal lives as Simon explained:

"I know during this I've had like loads of disasters with the house and stuff over the last few years and personal disasters with relationships and stuff and it's been very tough at times, it's been financially, virtually, unbearable at times, massive stress and I've just dealt with it. It's got me down a bit but I think some people would have just like given up, they wouldn't have known what to do and they'd have just – and I think, you know, years ago, I would have just gone to bits, I wouldn't have been able to cope with it. Whereas I've just, you know, just kept putting one foot in front of the other. It gives you like an endurance I suppose so that you can – you sort of just take things in your stride a bit more…so yeah, I think personal strength…I've definitely grown a lot in that area…" (Simon)

Several participants also related increases in personal strength to becoming calmer people and again whilst this was useful for enhancing their performance as a firefighter this was also useful in dealing with situations they encountered outside of work:

"I'm more probably calm and calculated to deal with incidents. You know, sort of conditioned myself and that sort of goes into your life as well. When you are away from the job you found that your outlook with things you do it the same because it works there and sometimes it is hard to switch off." (Paul)

Paul's comments suggests that this spill over into his personal life is not a choice but an inevitability and although this was viewed as a positive it may not take into account that the same approach may not always work in different settings.

Daniel interpreted increases in personal strength as being increasingly comfortable in his own skin and less concerned with what others think of him, similar Simon also expressed sentiments:

"I take time for myself now and I think I value myself a bit more and I don't pretend to like people if I don't, I don't tend to care what people think about me anymore really. Obviously I do to a degree but if somebody don't like me I'm not going to lose any sleep over it whereas before that would have really bothered me…" (Simon)

This appears to reflect recognition that ultimately what matters is not what others think about them but what they think of themselves.

Identification of new possibilities

Within the data there was little about developing new interests, new opportunities being available or new paths being established. Jayne appeared to be the only exception to this:

"I've got a big interest in supporting people because of the things that I have experienced and I have seen people experience that's a big interest that's changed" (Jayne)

Increased appreciation of Life

There was a general recognition amongst participants that encountering traumatic events, which generally involved death and destruction, brought with it an increased awareness of the fragility of human life and an understanding of the swiftness with which things can change, in Digby's words at the 'drop of a hat'. This was also accompanied by recognition of one's own mortality and in turn appears to have resulted in an increased appreciation of how precious life is and thus a determination to cherish it more as summed up by Julian:

"I think you cherish life more because of what you've seen, because where you've been and what you've done, I think you would and your family's life as well. I don't think you just keep it to yourself" (Julian)

Whilst some of the participants cherished the life they had, more others talked of embracing life more and adopted a 'seize the day' attitude:

"Like I say I live day by day and I sort of encourage that in my family and that if you've got a chance at things go for it because tomorrow you might not be here" (Jason)

Both comments indicate that the effect of engaging with traumatic events is not just felt at the individual level but extends wider, in this case to the family and taken together with Julian's comment below is perhaps suggestive of the existence of secondary posttraumatic growth:

"I think we both (him and his wife) cherish life more because I think I do pass on enough information that its… it can be not a brilliant world out there and accidents do happen and things do happen that's not very nice…" (Julian)

Participants also tended to favourably re-appraise their own situations in light of traumatic events, and often what had appeared as a problem subsequently diminished in significance:

"You see bad things happening to people and you think, well, you know, I'm whinging because I'm in my overdraft this month or I'm whinging because my boilers packed up or something like that. Or, you know, my girlfriends being a nutcase, and they've just lost their wife or their mother or, you know what I mean. And you think like, I've haven't really got much to moan about have I. So you kind of put things – gives you a better perspective on life I think. Stops you being so selfish, or self-centred." (Simon)

For Simon this reappraisal was also accompanied by the development of new perspectives:

"I think, I do appreciate the simpler things. I appreciate nature a lot more now than I used to... I enjoy the simpler things in life now than – I was always one to – you know I wanted the fastest motorbike and flashiest helmet and I'm just not bothered about any of that any more. Certain things are – happiness is really important in your life; I think health goes along with that. I'm a bit more health conscious than I used to be.... I'm not materialistic; I used to be quite materialistic I'm not anymore really at all. .....I'm a lot more kind of ..... easygoing I suppose. I don't get angry about much …" (Simon)

Taken together these comments suggest that changes in the very essence of the individual have been affected. This shift of perspective occurs at not only a philosophical level, but leads to behavioural changes as well and similar changes were described by other participants. For example, at one time Jayne used to finish night shifts exhausted and consequently would spend her days off doing very little except recovering, now she makes sure she spends that time going out and catching up with friends as she now describes herself as being positively motivated to do the things she enjoys while she can.

However, although the majority of participants endorsed this factor of growth there was also some suggestion that this increased appreciation of life is fleeting and only actually lasts for a short period after the incident. Moreover, even when this is present, it does not necessarily always translate to living life to the full; instead, maybe this is an ideal, which is not always achievable because everyday life gets in the way:

"I'd like to you, you know, you should live every day to its fullest, but you know when you've been at work every day and you don't do you, nobody does. But that'd be a good way to look at it. I don't, but I think you should." (Digby)

Improved relationships with others
The idea of the watch being the 'fictive' family was a theme that heavily pervaded all of the interviews and there was generally a feeling that colleagues could always be relied upon. Participants often attributed this increased closeness to colleagues as a result of engaging in unpleasant and difficult incidents together and Simon best summed this up:

"I think in any kind of relationship – it's not really the good stuff that brings you together it's the bad stuff. If you go through some bad stuff together and you come out the other side of it, you're strong your bond is stronger than it was before…" (Simon)

However, this increased closeness to colleagues did not necessarily translate to personal relationships and instead some participants reported maintaining an emotional detachment from others. Whilst maintaining emotional distance from the victims of the incidents they attended in their daily working lives was seen as essential for, preserving their own well-

being this had a subsequent effect on personal lives as described by Paul using the analogy of a drawbridge:

"You definitely get hardened and I think if you don't you wouldn't be able to do it. And you just, you'd go crackers. I think you'd definitely go ..round bend if you, you've got to put up some sort of.. you know, a bridge to it. And sometimes maybe the bridge is built too high.. and you go home and you sort of should be able to sort of let it down somewhat. I think you put barriers up just so you don't get hurt. And yet.. I think you can do it subconsciously, you don't do it purposely…" (Paul)

Some participants reported difficulties in letting this bridge down and for Simon at least this has made him appear as colder and less sensitive which has had impacted on his personal relationships. Other participants talked about becoming a harder person and thus rather than displaying more compassion for others which is categorized as an expression of growth participants reported displaying behaviours and making comments which often led loved ones to think of them as uncaring. This also underscores that such changes are not just happening at the cognitive level as they are being directly observed by those around them.

Positive spiritual changes
When asked what religion or spirituality meant to them none of the participants offered any definition of spirituality and the majority of participants responded by talking about their exposure to religion in childhood, their current religious belief system and the role of the brigade chaplain in debriefing following traumatic incidents. The majority of participants defined themselves as "not religious" and there were no declared changes in these belief systems as a result of dealing with traumatic incidents.

Thus, participants did not endorse this domain of growth and instead several participants, particularly those firefighters who had witnessed unexplainable loss of life, (particularly that involving children) questioned the existence of a supreme being on the grounds of bad things happening to innocent people:

"If there was a God he wouldn't let people die in such horrible ways" (Paul)

"There's people out there that are not very nice people, why can't it happen to them and not innocent 5 year old girls?" (Trevor)

This is not a particularly unusual reaction for people engaging with trauma and even religious people may ask if God is benevolent, how can such suffering be permitted. Several participants were cynical in their attitudes to religion but for one of the participants, Simon, attending an accident, which led to the death of a small child, acted as a turning point and set him on a new course:

"If you were religious you'd be praying for a miracle but I'm not so. I'm certainly not after that, that completely ….you know that confirmed my suspicion that there wasn't any supreme being. It kind of put a tin hat on that drew a complete line under that for me and I'm like anti-religious now." (Simon)

The only exception to this was Jason who although did not feel he had changed his beliefs as a result of his experiences he felt that he had become more accepting of others views and beliefs:

"I'd say I'm more accepting at other people's view on what there is and what there isn't. I'd have probably, in the past gone how can you think there's a God when there's all this death and destruction, I wouldn't say that to anybody now, I'd listen to what they want to say, they've got their opinion, they're entitled to it and I wouldn't disrespect them, because I don't know." (Jason)

This change in attitude manifests itself in his everyday life in the way that he treats his children; he now accepts that they may want to go to church and whereas previously he would actively have tried to discourage them, he now offers to take them.

The Model

As can be seen from Figure 5.3.1 posttraumatic growth is a complex and multi-faceted construct. Mindset was conceptualised, within the model, as an individual's psychological positioning, which subsequently influences the appraisal of a traumatic event. This was evidenced in the peripheral category of training/work preparedness, in which experience was seen as influencing the way in which incidents were perceived and responded to. However, although the analysis produced three peripheral categories, resilience, changing behaviours and training/work preparedness there was little evidence of other pre-trauma characteristics within the data. Consequently, when the model was operationalised (details of which are provided in chapter six), constructs reflecting personal characteristics were included from reviewing the existing literature such as optimism and well-being, which have consistently demonstrated links to posttraumatic growth (Tedeschi & Calhoun, 1996: Carver and Antoni, 2004; Helgeson et al, 2006). In addition, an individual's mindset will also relate to the way in which they cope with traumatic event and as mindset is malleable, the coping strategies an individual uses will impact on mindset as will the extent to which the individual experiences ongoing traumatic reactions.

During the interviews, all participants recounted attending incidents, which they perceived to be traumatic, and therefore the category of the event appeared at the centre of the model, as this was critical in instigating the process. Although participants spoke about several incidents, as discussed in section 5.4, there was generally one incident, which participants immediately recalled as being the one that had affected them most in terms of

the development of traumatic reactions. All participants acknowledged experiencing symptoms of posttraumatic stress in the aftermath of these incidents and evidence of these traumatic reactions in the form of re-experiencing, anger and avoidance was detailed in section 5.5. Although variations existed in the severity and duration of these symptoms, for some participants these symptoms were enduring and were still being experienced at the time of the interviews despite the incident, which had caused them, occurring many years previously. Thus as all participants also reported experiencing posttraumatic growth these symptoms of posttraumatic stress were seen as a prerequisite for growth to occur.

The coping strategies that participants used were discussed in section 5.6 and there was evidence within this section of the relationship between coping and posttraumatic growth. For example, talking to colleagues in the aftermath of traumatic incidents was a primary strategy articulated by all participants, which led to an increased closeness to colleagues, a facet of posttraumatic growth. Conversely, the existence of posttraumatic growth influenced the way in which individuals coped with traumatic incidents. For example, the increased closeness to colleagues enabled individuals to talk about their feelings and reactions to a traumatic incident, which in turn led to acceptance.

5.9 Measures of Posttraumatic Growth and Posttraumatic Stress

Once the qualitative analysis was completed, the measures of posttraumatic growth and posttraumatic stress that participants had completed immediately prior to the interviews were scored and the results are reported in Table 5.9.1 and Table 5.9.2 respectively.

Table 5.9.1 *Participants Scores on the Posttraumatic Growth Inventory*

	Age	Length of Service (years)	Time since traumatic event (years)	Total PTGI Score (105)	FACTOR ONE Relating to others (35)	FACTOR TWO New possibilities (25)	FACTOR THREE Personal strength (20)	FACTOR FOUR Spiritual change (10)	FACTOR FIVE Appreciation of life (15)
Alan	32	6	1	34	10	5	10	0	9
Daniel	44	18	15	25	7	2	6	0	10
Marc	47	22	21	66	25	20	8	5	8
Paul	46	25	21	52	24	12	5	1	10
Jayne	35	8	4	59	24	14	10	3	8
Toby	25	7	6	51	16	10	9	3	15
Jason	48	10	7	54	19	12	13	1	9
Julian	53	26	17	61	26	10	13	0	12
Billy	43	24	5	22	9	2	3	0	8
Trevor	44	19	18	46	16	8	12	0	10
Simon	46	13	10	34	3	9	19	0	3
Digby	47	23	19	30	3	8	17	0	2

As can be seen from Table 5.9.1 all participants reported experiencing posttraumatic growth to some degree (total scores ranging from 22 to 66 with a mean total score of 44.5, standard deviation 14.3). This relatively large standard deviation could be reflective of the idiosyncratic nature of the experience. Participants reported experiencing the highest levels of growth in the domain of increased appreciation of life followed by personal strength.

One thing that is striking from initial inspection of the table is that seven participants scored zero on the factor of spiritual change, this was the only factor that attracted zero scores. This appears to suggest that participants in this study did not endorse this as a domain of growth, which mirrors the qualitative analysis (very low scores on this factor were subsequently found in the quantitative study which sought to operationalise this model – see 7.5). These findings could possibly provide support for the assertion that the inclusion of religiosity and spirituality within the definition of posttraumatic growth is problematic and should be excluded from scientific studies into posttraumatic growth (Joseph, 2011). A fuller discussion of this debate is provided in section 5.10.

Research has suggested a relationship between age and posttraumatic growth with younger people being expected to report more growth than older individuals (Tedeschi & Calhoun, 2004). This may be due to older individuals being more likely to be concerned about the imminence of their own demise given the temporal proximity to one's own death (Davis et al, 1998). However, an initial inspection suggests that this sample does not support this with older participants, Marc and Julian reporting the highest levels of growth.

Research has also investigated the relationship between the period of time that has passed since the traumatic experience and the amount of posttraumatic growth reported (see 3.8) and there is some evidence to suggest the longer the time since the critical event the greater the extent of posttraumatic growth reported (Cordova et al, 2001; Evers et al, 2001). However, again on initial inspection this data does not appear to support this assertion with participants at both ends of the spectrum (i.e. Alan experiencing the trauma one year previously and Digby experiencing the trauma 19 years previously) reporting relatively similar total posttraumatic growth scores.

Increased length of service in the Fire and Rescue Service may equate to cumulative exposure to traumatic events and research question A4 (see 1.3) seeks to explore whether posttraumatic growth is cumulative or related to a specific event. In this study, participant's length of service ranged from six years to 26 years and on initial inspection does not appear to be a predictor of growth. Although participants with longer service such as Paul (25 years' service) and Julian (26 years' service) had some of the highest total posttraumatic growth scores, 52 and 61 respectively, Toby with only seven years' service and Jayne with eight years' service had very similar posttraumatic growth scores of 51 and 59 respectively.

Table 5.9.2 P*articipants Scores on the Posttraumatic Diagnostic Scale*

	Age	Length of service (Years)	PTSD Diagnostic criteria met	Number of symptoms endorsed (0-17)	Symptom severity score (0-51)	Symptom severity rating (no rating, mild, moderate, moderate to severe, severe)	Symptom duration (acute, chronic, does not apply, incomplete information)	Level of Impairment in functioning (unknown, no impairment, mild, moderate, severe)
Alan	35	6	No No Criterion met	1	1	Mild	Does not apply	No Impairment
Daniel	44	18	No Criterion B met	1	1	Mild	Does not apply	No Impairment
Marc	47	22	Yes All criterion met	12	13	Moderate	Chronic	Severe
Paul	46	25	No Criterion A met	0	0	No rating	Incomplete information	No impairment
Jayne	35	8	No Criterion B/E met	2	2	Mild	Chronic	No Impairment
Toby	25	7	No Criterion D met	4	6	Mild	Chronic	No impairment
Jason	48	10	Yes All Criterion met	9	9	Mild	Chronic	Severe
Julian	53	26	No Criterion A/B met	1	1	Mild	Incomplete Information	Mild
Billy	43	24	No Criterion B/E met	6	11	Moderate	Chronic	Mild
Trevor	44	19	No Criterion B/D met	4	7	Mild	Does not apply	Mild
Simon	46	13	No	11	25	Moderate to	Chronic	No Impairment

			Criterion A/B/C/D/E met			Severe		
Digby	47	23	No	9	9	Mild	Chronic	Mild
			Criterion B/D/E met					

Criterion A – Exposure to a traumatic event

Criterion B – Re-experiencing symptoms

Criterion C – Avoidance symptoms

Criterion D – Arousal symptoms

Criterion E – Duration > 1 month

Criterion F – Level of impairment in functioning.

The scores on the trauma scale, reported in Table 5.9.2 suggest that all participants, except Paul, were still experiencing symptoms of posttraumatic stress, with re-experiencing being the most prevalent. This was supported by the qualitative analysis, in which there was evidence of re-experiencing, avoidance, anger and guilt (see 5.5-5.6). Paul was the only participant who divulged, during the interview, that he had had three months off sick following his most traumatic incident, six months taking anti-depressants and a long period of counselling. Although he did not receive a clinical diagnosis, he believes that during this time he was suffering from posttraumatic stress disorder. Initial examination of the data would also suggest that two participants, Marc and Jason met the diagnostic criteria for posttraumatic stress disorder (although it is accepted that the trauma scale is not a replacement for a structured clinical interview, the usual method for diagnosing PTSD).

For the majority of participants the severity rating of symptoms was mild. However, seven participants had chronic scores on symptom duration indicating that they had been experiencing these symptoms for a period of three months or longer and half of the participants were experiencing some level of impairment in functioning. Furthermore, the traumatic incidents, which had led to the development of these symptoms often occurred many years previously, suggesting that these symptoms had been ongoing for an extended period of time. For example, Marc and Digby were still experiencing symptoms in response to incidents they had attended 21 and 19 years previously.

5.10 General Discussion

All participants in the study reported dealing with events which could be described as "critical incidents" defined by Mitchell (1983) as "any situation faced by emergency personnel that causes them to experience unusually strong emotional reactions which have the potential to interfere with their ability to function either at the scene or later" (p.36). As a result of dealing with such incidents, all participants in the study exhibited both symptoms of posttraumatic stress and reported experiencing posttraumatic growth, evidenced in both the interviews and completion of the quantitative measures. This provides further support for the position that these two constructs are not at opposite ends of a continuum but instead coexist as manifestations of negotiating trauma (Shakespeare-Finch & Lurie-Beck, 2014). This finding also accords with previous research that found firefighters experienced both posttraumatic stress symptoms and posttraumatic growth following exposure to work-related traumatic events (Kehl, Knuth, Hulse, & Schmidt, 2014). Consequently, traumatic stress risk management needs to facilitate positive outcomes and minimise negative outcomes and recognition of this has implications for how the traumatic stress management process is conceptualized (Paton, 2006).

In recounting incidents which participants perceived as traumatic, they described a varied and wide range of incidents, but generally these were not large incidents involving mass casualties, which might have been expected (Regehr, Goldberg, & Hughes, 2002). Although there did not appear to be any specific criteria as to what would make an incident

121

traumatic, participants perceived that making a personal connection with a casualty could make an incident traumatic for them. This is consistent with the findings of previous research that identified the subjective experience of an emotional connection to the casualty as an important factor in the degree to which the incident was perceived as traumatic in ambulance paramedics (Regehr et al, 2002). Similar findings were reported in more recent research by Kirby, Shakespeare-Finch, and Palk (2011), who reported that paramedics were most affected by incidents in which they had knowledge of the victim or were able to personally identify with them in some way. In such cases more intense levels of posttraumatic stress were recorded but also higher levels of posttraumatic growth (Kirby, Shakespeare-Finch, & Palk, 2011). Some of the participants in the current study also reported particular difficulties in dealing with incidents involving children, which accords with findings of previous research by Haslam and Mallon (2003), who reported that firefighters felt most distressed when children were involved in the incident. In the current study, participants attributed these difficulties to recognition of the increased vulnerability of children, an increase in their own feelings of helplessness and for participants who had children themselves feelings of empathy for the parents. Previous research investigating police officers experiences of posttraumatic stress, found higher rates of posttraumatic stress disorder were associated with incidents in which police officers were confronted with the vulnerability of victims (Carlier, Lamberts, & Gersons, 2000). Qualitative research using a sample of firefighters also found that firefighters experienced increased psychological distress as a result of identifying with victims of disaster (Fullerton, McCarroll, Ursano, & Wright, 1992).

The coping strategies, which appeared to be most frequently used by participants, were cognitive strategies, which allowed firefighters to remain emotionally distant from the casualties, which again accords with the findings of previous research (Avraham, Goldblatt, & Yafe, 2014). This type of coping creates what Lindy (1985), referred to as a "trauma membrane" (p. 153), which allows emergency services personnel to protect themselves emotionally from incidents which threaten their well-being. Within the analysis the category of 'being absent in the moment' was found to be the primary strategy, which participants used to maintain emotional distance whilst attending an incident and constitutes what Carver et al. (1989) referred to as mental disengagement. The coping strategy of mental disengagement is traditionally thought of as being maladaptive, and encompasses activities, which take an individual's mind off a problem such as daydreaming or immersing oneself in TV (Carver et al, 1989). Although previous research with emergency services personnel has suggested an association between the use of such maladaptive coping strategies and PTSD symptomology (Skeffington, Rees, & Mazzucchelli, 2017) in the current study, this coping strategy appeared to be adaptive, allowing participants to maintain an outward calm, necessary to ensure a well-executed and effective rescue, and preserve their own mental well-being. Consistent with previous research undertaken by Avraham, Goldblatt, and Yafe (2014) the majority of participants also engaged in task orientated coping during an

incident, focusing on the technical side of the rescue and the next step to be taken. Previous research has evidenced a link between this task orientated coping and a reduction in anxiety (Le Blanc et al, 2011) and once again in the current study this appeared to serve a protective role in allowing participants to remain emotionally detached from the casualties. A further cognitive strategy, which does not appear to have been previously identified within the existing literature, is categorised in the analysis as blanking out faces. Again, this was a strategy that enabled firefighters to maintain emotional distance from the casualty and constituted an additional layer of protection over and above that afforded by wearing the uniform, which was required when the situation demanded close contact with the casualty.

On completion of the incident, participants utilised another cognitive strategy categorised within the analysis as turning negatives into positives. This involved reviewing the incident from a technical standpoint, a strategy, which has been previously documented within the literature (Regehr et al, 2002). Participants either did this alone or with colleagues and it enabled them to begin processing the event and alleviate distress by focusing on the lessons that could be learnt for the future. This was very much a part of the ethos of the Fire and Rescue Service, which is one of continuous learning and development. Within the emergency services literature this conscious development through experience and reflection has been theorised to lead to greater maturity, increased understanding and more self-confidence (Elmqvist, Brunt, Fridlund, & Ekebergh, 2009). Positive appraisal has been consistently associated with higher levels of posttraumatic growth in the general population (Sears et al, 2003; Urcuyo et al, 2005; Yeung et al, 2016) and suggested as being crucial for the successful adaptation to traumatic events and a pre-requisite for growth to occur. This finding provides support for Yeung et al. (2016) assertion that individuals who use more positive re-appraisal framing tend to see negative events as opportunities to learn new things, which is why they are more likely to find meaning in the traumatic event and thus experience posttraumatic growth (Park et al, 2008).

A second coping strategy, which was strongly evidenced throughout participant's accounts, and has also been consistently associated with posttraumatic growth in the general population is acceptance (Park et al, 1996; Linley & Joseph, 2004; Urcuyo et al, 2005). It has been argued that the ability to accept situations that cannot be changed is believed to be crucial for adaptation to uncontrollable or unchangeable events (Zoellner & Maercker, 2006). Firefighters frequently have to deal with incidents, which are both uncontrollable and unchangeable and the ability to accept these situations was seen by participants as crucial to both preserving their own well-being and enabling them to carry on in their role.

Social identity theory may also provide a useful theoretical framework with which to understand these findings. In the model of stress provided by social identity theory, group membership influences an individual's appraisal of a stressor and subsequent stress outcomes as this group membership is the basis for both giving and receiving social support to and from fellow group members (Haslam, O'Brien, Jetten, Vormedal, & Penna, 2005). In

turn this social support acts as a buffer against the harmful effects of stress (Haslam, 2004) as when individuals identify with a particular social group they are more likely to help fellow group members, more likely to receive help from fellow group members and more likely to make use of that help. Moreover, evidence has suggested that membership of a specific occupational group with distinct social identities can impact on an individual's primary appraisal of stressors related to those identities (Haslam et al, 2005). Haslam, O'Brien, Jetten, Vormedal, & Penna (2005) conducted a study using a sample of Royal Air Force bomb disposal team and a sample of bar workers and reported that bar workers found dealing with bombs much more stressful than performing bar work whilst bomb disposal experts found bar work much more stressful than disposing of bombs. Thus, bomb disposal experts were relatively unperturbed by the stresses of handling bombs (Haslam et al, 2005) which appears to suggest that the groups collective experiences enabled them to normalise work which may appear abnormal and stressful to others (Ashforth, 2001).

In the current study, it was clear from participant's accounts that they frequently faced situations in the course of their normal daily working activities that many would deem stressful, even traumatic. Throughout the transcripts, there were multiple examples of what could be considered, horrific rescues; one notable example, which was recounted, was a firefighter scraping dead bodies from car seats with a chisel following a fatal road traffic collision and subsequent fire. This was not, however, an incident which he recounted as traumatic but instead articulated it in terms of something that was not pleasant but at the same time accepting that it was very much part of his everyday role. However, in the same way that bomb disposal experts work as a team firefighters always operate as part of a team, the 'watch', and it was notable throughout all participant's accounts when talking about incidents they had attended they primarily used the expression 'we' as opposed to 'I', thus identifying themselves as part of the watch first and an individual second. Operating as a collective undoubtedly afforded firefighters in the current study a certain level of protection against the stresses of the job and when a recue was unsuccessful it allowed firefighters to accept the outcome and move forward from the incident. It is noteworthy that some of the most severe and enduring traumatic reactions experienced by firefighters in the current study followed incidents in which they perceived that the team had not done the best job that they could.

Evidence of a strong occupational identity within Fire and Rescue Service personnel has been documented in previous research (Fannin & Dabbs, 2003) with Lee and Olshfski (2002) even suggested this collective identity is so strong that firefighters are never actually off duty. This was further supported by the current study in which a very strong sense of this shared identity pervaded all participants' accounts together with a tremendous sense of pride in being a firefighter. In line with social identity theory (Haslam, 2004) the giving and receiving of social support to and from fellow watch members was a recurrent theme throughout the data and a key coping strategy utilized by all participants. Firefighters believed that only fellow watch members can ever really understand what they have

experienced and therefore, talking to colleagues in the aftermath of incidents in the majority of cases was sufficient to resolve any difficulties they experienced with the incident.

The overall mean for the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) for participants in study one was 44.50, which researchers have previously referred to as representing a moderate amount of posttraumatic growth (Shakespeare-Finch et al, 2003; Morris et al, 2005). However, there appeared to be a disconnect between these moderate amounts of growth participants reported on the quantitative measure and lower levels of growth that participants reported during the interviews, which was documented in the resulting qualitative analysis. There could be a number of possible explanations for this. Firstly, within the Fire and Rescue Service, there is an emphasis on the signs and symptoms of PTSD, understandable as personnel are engaged in dealing with potentially traumatic incidents, which have been, consistently linked to the development of negative sequelae (Corneil et al, 1999; Brown et al, 2002; Chang et al, 2003). Consequently, it is likely that personnel are familiar with the negative effects of trauma but conversely, very little is known or understood about the construct of posttraumatic growth, certainly none of the participants in study one had any knowledge of its meaning or existence. Thus, personnel are unlikely to be familiar with talking about the positive benefits of engaging with traumatic events and this may not even be something that they have previously given any thought to. One of the participants felt that the positive aspects of dealing with incidents was often ignored as perhaps there was a feeling that it was not politically correct to talk about the positives of an incident which had resulted in someone's death. Therefore, as this was likely unfamiliar territory participants may have found it difficult to articulate their thoughts and opinions.

Secondly, however, this could be interpreted, as providing support for Hobfoll et al. (2007) action focused model of growth, which posits that actual growth is only realised when cognitive reframing translates into behavioural change. Therefore, whilst participants were able to report growth on a measure that offered multiple-choice options they were less able to articulate what this looked like in their daily lives, which may suggest that the growth they reported had not translated to behavioural change. That is not to say that there was no behavioural change exhibited within participants accounts and neither does it suggest that a lack of behavioural change invalidates participant's reports of growth as participants may be in situations where action was neither warranted or feasible (Westphal & Bonanno, 2007). However, Hobfoll et al. (2007) model also posits that reports of growth are often shallow and fleeting and for true growth to occur it must lead to actual changes, which are sustained once the initial period following the trauma has passed. There is some support for this position within the data from study one as a number of participants suggested that the increased appreciation of life one feels after attending a traumatic incident was fleeting and forgotten within a short time of the incident occurring. One reason cited for this was that daily life gets in the way.

Participant's reports of posttraumatic growth, however, did align with four of the five domains of growth suggested by Tedeschi and Calhoun (1996) offering support for the idea that there is commonality in the experience of posttraumatic growth (Calhoun & Tedeschi, 2013). Previous research suggests that increased appreciation of life is one the most common growth experiences following traumatic incidents, which evoke strong reminders of mortality (Calhoun & Tedeschi, 2013). As firefighters, duties include cutting casualties out of road traffic accidents, dealing with potential suicides and handling dead bodies (Moffitt et al, 2014) it is perhaps not surprising that this was the domain of growth in which the most posttraumatic growth was expressed during the interviews. The pathway to this domain of growth did appear to be through the increased awareness of the fragility of human life, which brought with it recognition of one's own mortality. Previous research has suggested that appreciating how precious life is can lead to revision of life priorities (Lindstrom et al, 2013) a typical manifestation being attributing an increased importance to things that were previously viewed as the small things in life and again this was evidenced in participants accounts. The suggestion was also made within this domain of growth, that participants passed on enough information for close family members to experience vicarious posttraumatic growth. The existence of vicarious posttraumatic growth is well documented within the literature and has been evidenced in a variety of different populations, such as mental health workers (Hyatt-Burkhart, 2014) and interpreters (Splevins et al, 2010). This may be a fruitful area for further investigation as it introduces the possibility that close family members of emergency services personnel, can also benefit from positive changes as a result of their loved ones daily working activities.

Previous research has suggested that within the relating to others domain of growth, trauma survivors have reported an increased sense of closeness to others, particularly close friends or family members (Calhoun et al, 2010). This was reflected in participant's accounts in an increased closeness to fellow watch members who are often considered akin to family members in this population. This finding was not unexpected as these close co-worker relationships have been previously well documented in the literature (Kirschman, 2004; Hill & Brunsden, 2009). However, whilst participants reported an increased closeness to colleagues some participants also reported difficulties in establishing or maintaining closeness in personal relationships, which could be seen as the complete antithesis of posttraumatic growth. This was the result of a spillover of the emotional distancing used by participants, when attending incidents to prevent establishing an emotional connection with a casualty and thus protecting their own well-being. This problem in shifting from emotional distancing to emotional openness in intimate relationships has been previously documented in research involving Canadian paramedics (Regehr et al, 2002), which suggests commonalities of experiences across different organisations involved in emergency response work and also across cultures within emergency services personnel. Regehr, Goldberg, and Hughes (2002) suggested that the organisational response to this should be two fold; firstly, this issue needed to be addressed by training programs developed for

emergency responders and secondly, personnel should be given assistance in developing strategies, which do not negatively impact on their personal lives. Although these recommendations were made some time ago and concerned the Canadian Fire and Rescue Service, they could be equally applicable to the current UK Fire and Rescue Service.

It has also been suggested, that another common expression of posttraumatic growth within this domain relates to an increased willingness on the part of the individual to display and talk about their feelings and emotions with trusted others (Calhoun & Tedeschi, 2013). Analysis of the data in this study, however, revealed ambivalence in participant's attitudes towards emotional expression. On the one hand, participants explicitly articulated the importance of talking in the aftermath of incidents, ideally to teammates, suggesting that this provided a forum for a discussion of everything and anything and was a critical activity for getting things "off your chest" and making meaning of a traumatic incident. Whilst there was much repetition within the data of the phrase "we talked about it", what constituted the "it" was actually never fully or clearly articulated. Thus, although the context around this suggested that participants were referring to talking about their feelings and emotions relating to the incidents they had attended, this remains somewhat unclear. Conversely, there was an implicit suggestion that echoed throughout all the participant's accounts that emotional expression was risky and emotion was something, which needed to be contained and in order to achieve this it was best kept hidden. The expression of emotion appeared to run contrary to the ability to remain calm and dispassionate, which participants perceived as the gold standard of firefighting. This notion that expressing emotions is risky has been previously documented in qualitative research exploring UK Police Officers experiences of social interactions following traumatic incidents (Evans, Pistrang, & Billings, 2013). In Evans et al. (2013) study the fear of emotional expression was linked to fears about appearing weak and beliefs that such expression could potentially damage an individual's reputation as this was not considered in line with the norms of British culture or the macho culture of the Police. In the current study, however, this attitude towards emotional expression appeared to be primarily motivated by a desire to protect one's own well-being, as emotional expression was recognised as having the potential to interfere with effective functioning. This category does, however support Tedeschi and Calhoun's (2004) assertion that posttraumatic growth is both a process and an outcome. Firefighters articulated the view that dealing with traumatic incidents brought the watch closer together and at the same time, this increased closeness to colleagues allowed for talking which enabled acceptance and allowed for making meaning of the event, both of which are thought to be part of the process of posttraumatic growth (Tedesdchi & Calhoun, 2004).

Within the personal strength domain of growth a common theme of expressed by survivors of trauma is that they are stronger than they thought they were and much more capable of handling a crisis than they were before (Carnelley et al, 2006). All the participants within the current study endorsed the view that dealing with traumatic incidents had resulted in increases in personal strength. Again as in the other categories of growth there appeared to

127

be an inevitable spillover from work to personal life with firefighters reporting being more able to deal with situations in their personal life, which previously they would have struggled to cope with. However, it should be acknowledged that participants spoke about the ethos of the Fire and Rescue Service as one of continuous learning and development, together with a deep-rooted emphasis on personal development, which was applicable to all personnel irrespective of role. Thus, although participants themselves attributed increases in personal strength to dealing with traumatic incidents it was very difficult to determine whether any of the positive changes that were being articulated were actually a consequence of working within this culture. This question as to whether it was possible to disaggregate between growth that was attributable to working within the Fire and Rescue Service as opposed to as a result of engaging with traumatic incidents was one of the research questions posed at the beginning of this programme of research (B2) and remains unanswered by this qualitative study.

Although there was very little evidence of experiences of the domain of new possibilities within participants accounts participants did not appear to endorse spiritual change as a valid domain of growth in either the interviews or completion of the quantitative measure. This supports Znoj (2005) findings that European samples are unlikely to answer questions related to spirituality and do not view religiosity as a form of strength. It mirrors the findings of previous qualitative research, which was undertaken using student samples from outside the United States (Shakespeare-Finch & Copping, 2006; Shakespeare-Finch, Martinek, Tedeschi, & Calhoun, 2013). However, it could be argued that this finding provides support for Joseph (2011) argument, that religiosity and spirituality should be excluded from the definition of posttraumatic growth. Firstly, Joseph (2011) argues that there is confusion over the direction of change that is experienced as growthful by individuals and secondly, there is a lack of consensus within the research community as to whether religious and spiritual beliefs actually represent positive functioning. Clearly, there is some empirical research to suggest that some individuals who experience a traumatic event report increased spirituality and religiosity, for example, a sample of individuals who were either HIV positive or diagnosed with Aids reported greater spiritual or religious faith (Siegel & Schrimshaw, 2000). However, Joseph (2011) argues that whilst these individuals experienced greater spiritual and religious faith as growthful for others it is possible that a lessening of faith could be perceived as growthful. The effect that trauma has on an individual's belief system is dependent on the nature of their faith, its strength and rigidity pre-trauma (Joseph, 2011). In considering the domains of growth that relate to personal strength, identification of new possibilities, relating to others and appreciation of life, general consensus exists that they are indicative of positive functioning (Joseph, 2011). However, Joseph (2011) argues that this is not the case with the domain of spiritual change, as an individual's own belief system will determine whether increased religiosity and spirituality is considered indicative of positive functioning. Thus, religious individuals are likely to see a deepening of faith or

spirituality as growthful whereas atheists may see these changes as being illusory or even as delusory (Joseph, 2011).

5.11 Strengths and Limitations of the Study

Within the sample there was a good range of ages (25-53), lengths of service (six years to 26 years) and roles as participants were either Firefighters, Crew Managers, Watch Managers or Station Managers. Thus, the sample reflected the diversity within this population, which is the aim of qualitative research (Kuzel, 1992). However, participants replied to advertisements and thus self- selected so it is not known how firefighters who have experienced traumatic events but were not willing to talk about their experiences experienced growth or indeed, if they experienced growth at all. It is also not known if the research captured participants who experienced the most severe traumatic reactions, as it is possible that these firefighters did not wish to participate in order to avoid reminders or had already left the service. Future research could address this by seeking to include retired firefighters and early service leavers and in doing so may assist in developing a more comprehensive understanding of these variables.

Researcher effects may also have had some bearing on data collection with the researcher being female and the majority of participants being male, as it may have influenced how comfortable participants felt disclosing their reactions to trauma and subsequent thought processes. Conversely, however, it has been suggested that male participants prefer to talk to a female about private experiences (Charmaz, 2006). Certainly, throughout the interviews all the participants appeared to be open and honest in their accounts often to the point where intense emotions were unwittingly displayed.

Administering both positive and negative measures to participants and balancing the interview schedule between trauma and growth addresses the criticism of this research area that measurement tools which, include only positive items establish a response set that is biased towards positive change (Ford et al, 2008). In addition, Shakespeare-Finch et al. (2003) also researching in the area of emergency services personnel called for further research that included both negative and positive post- trauma outcomes within the same design in order to obtain a broader view of an officers post-trauma psychological well-being and thus, this design answers that request.

Although the measures used in the study were self-report, (see 3.11) The Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996), used throughout this programme of research, has been recognised as the gold standard (Johnson & Boals, 2015). Its strong psychometric properties are reported in section 5.2 and a number of studies using a variety of different methodologies have demonstrated the construct validity of the PTGI (Tedeschi & Calhoun, 1996). For example, a qualitative thematic analysis of semi-structured interviews with trauma survivors (Shakespeare-Finch et al, 2013), rating the amount of growth reported in essays written by individuals who have experienced traumatic events (Weinrib, Rothrock, Johnsen, & Lutgendorf, 2006) and comparing trauma survivors accounts of change

with significant others (Shakespeare-Finch & Barrington, 2012). The five factor structure of the PTGI has been supported by many studies using confirmatory factor analysis (Taku et al, 2008; Brunet, McDonough, Hadd, Crocker, & Sabiston, 2010; Purc-Stephenson, 2014). The PTGI has been used across a wide variety of samples experiencing many different types of traumatic events and has received psychometric support for its translation into a large number of different languages (Weiss & Berger, 2006; Mystakidou et al, 2008; Teixeira & Pereira, 2013). Future research could however, ameliorate the concerns about self-report data by also using reports from family and close friends, which has been previously used to corroborate participant's reports of posttraumatic growth (Shakespeare-Finch & Barrington, 2012). One of the participants in study one alluded to the fact that it might be appropriate to ask people close to him how he had changed as a result of his experiences as they witnessed the changes at close quarters they may actually be in a better place to describe them than he was.

Finally, although the researcher did spend a considerable amount of time familiarising herself with the Fire and Rescue Service prior to data collection, data for the quantitative study was collected exclusively by way of semi-structured interviews. Interviews are recognised as the most prevalent method of data collection for qualitative research (Blakely & Moles, 2017) and particularly well suited to the collection of data on sensitive topics (Richards & Schwartz, 2002). A semi-structured format was chosen because they allowed participants to fully explore the issues, which were of concern to them in relation to the research question, and fit well with the grounded theory approach (Charmaz, 2006). All possible steps were taken to create a sense of reciprocity between the researcher and the participants (Mills et al, 2006) in order to create the most complete data set possible (this was fully discussed in section 4.4). All interviews were in-depth and elicited rich, detailed information about participant's traumatic exposure and subsequent reactions and experiences. In line with the reflexive approach undertaken throughout the thesis the interview schedule was also amended after the first four interviews were conducted (this was discussed fully in sections 5.2.1/5.2.2). However, although the interactions between participant and interviewer can be thought of as a collaborative event (Denzin, 2001) it is nevertheless a single event characterised by an artificially produced form of interaction (Blakely & Moles, 2017) the content of which it could be argued is ultimately determined by the researcher as they have designed the interview schedule (Kvale, 2007). Moreover, the 'radical critique of interviews' argues that researchers make questionable inferences from what participants say in particular interview contexts about events, attitudes, and/or behaviour beyond those contexts (Atkinson & Coffey, 2002).

This does not mean, however that interviews are inherently flawed as a method for collecting qualitative data but rather that all representations, including the 'stories people tell one another to explain who they are and what they are doing….give us a picture that is only partial…' (Becker, 2007, p.3). Thus, it may be beneficial for future studies to consider ethnographic approaches to compliment traditional interview based methodologies as it has

been suggested that such approaches help overcome the limitations of relying solely on interview data (Reeves, Peller, Goldman, & Kitto, 2013). The central aim of ethnography is to 'get inside the way each group of people see the world' (Hammersley, 1985, p.152) and the key methodological approach is participant observation (Reeves, et al, 2013). Through participant observations, ethnographers have the opportunity to gather detailed and comprehensive understandings of the social phenomenon under investigation (Reeves, Kuper, & Hodges, 2008). 'Immersing' oneself in the social setting under enquiry also allows the researcher to gain insights into social practices that are normally hidden from the public gaze (Reeves et al, 2013). Thus, the two approaches can be seen as complementary as participant observation provides insight into everyday life whilst interviews provide insight into articulating and explaining social everyday life (Reeves et al, 2013). A lengthy period of observation was probably unrealistic given the time scales involved in data collection for the current study, however future studies should consider adopting this approach.

5.12 Conclusion to Chapter

This chapter has charted how data obtained in study one was used to develop a grounded theory model of growth, which explains how members of the Fire and Rescue Service experience and deal with traumatic events and subsequently experience posttraumatic growth. In order to explore and test this model further an operational working model needed to be developed and the following chapter will detail this development.

Chapter Six: Operationalising the Grounded Theory Model of Growth

6.1 Introduction to Chapter

This chapter details the process that was used to move from the grounded theory model of growth that was developed from the qualitative data in study one to an operational working model that could be empirically tested on a large sample of Fire and Rescue Service personnel. This process began with a review of the scales that conceptually map on to the grounded theory model and was concurrently undertaken with a comprehensive literature review of each of the constructs identified in the model to ensure a good fit between the variables in the model and the measures used. This chapter outlines the process that were undertaken and the considerations that were made when selecting the psychometric scales that were used in study two.

Table 6.1.1 details the constructs identified in the grounded theory model, the operational constructs identified in the existing literature and the scales that were used to measure those constructs in study two.

Table 6.1.1

Study One Variables Mapped to Measurement Scales

Conceptual category from grounded theory model	Operational construct in the literature	Scale name
Mindset	Personality	50-item IPIP representation of the Neo-PI-R (Costa & McCrae, 1992)
		50 items
	Optimism	Revised Life Orientation Test (Scheier, Carver, & Bridges, 1994)
		10 items
	Resilience	Connor-Davidson Resilience Scale (Connor & Davidson, 2003)
		25 items
	Training/Work Preparedness	Single Likert type question asking participants how well they felt their training prepared them for the work to be done (adapted from Martin, 1989)
		1 item
	Well-Being	Ryff Scales of Psychological Well-Being (Ryff, 1989).
		54 items
The event	Traumatic event	The Core Beliefs Inventory (Cann et al, 2010)
		9 items
Traumatic reactions	Traumatic reactions	Post-traumatic Diagnostic Scale for DSM 5 (Foa et al, 2016)
		26 items
		One item added at the end of the PDS -5 asking how long ago the traumatic incident had occurred.
Posttraumatic growth	Posttraumatic growth	The Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996)
		21 items
Coping Strategies	Coping	Cope Inventory (Carver, Scheier, & Weintraub, 1989)
		60 items

6.2 The Process of Scale Selection

Measures were considered and shortlisted using the guidance provided by Furr (2011) in the use, evaluation and interpretation of scales. Reliability (internal consistency and test-retest reliability) and validity (face, content, criterion and construct validity) statistics were evaluated where they were available as not all scale validation papers published all of the appropriate statistics. However, if the relevant psychometric information was not available the measure was discounted on this basis alone. The dimensionality of the measures was also considered as this directs researcher's evaluations of reliability and validity and is not clearly reflected by Cronbach's coefficient alpha (Furr, 2011). The use of multidimensional scales may be problematic in that they require more psychometric evaluations as robust correlations between the dimensions are needed to demonstrate that the dimensions share a common psychological variable (Ibid). Two multidimensional measures were used, for example, The Ryff Scales of Psychological Well-Being was chosen as the measure of well-being because well-being is defined as a multidimensional construct (Ryff, 1989). However, The Ryff Scales of Psychological Well-Being reported strong correlations between the dimensions (Ryff, 1989). Item development and construction was a further consideration and where possible measures were chosen that had been developed from a sound theoretical model (Keszei, Novak, & Streiner, 2010).

Although psychometric evaluations were the primary factor in scale selection, there were additional considerations that were taken into account during scale selection. Firstly, the length of the measures was deemed an important consideration given the number of measures that would be needed to operationalize the model and concerns around the potential for participant fatigue. Secondly, wherever possible, measures were used that had been most widely used in the particular area of posttraumatic growth research as it was thought that this would aid in the comparison of results between this study and the existing literature. Thirdly, and again wherever possible, measures were used that had previously shown to be reliable in emergency workers or firefighter samples reflecting the position that reliability is not a fixed property of a scale but a function of the instrument, the group with which it is being used and the circumstances (Keszei et al, 2010).

Discounting measures designed and validated within a population of Rescue Workers
Consideration was given to using measures, which were specifically designed and validated on samples of emergency services workers such as The Coping Response in Rescue Workers (CRRW; McCammon, Durham, Allison, & Williamson, 1988). This is a 32-item measure, which assesses coping across four dimensions; cognitive reappraisal of work events, seeking support and emotional expression, general cognitive reappraisal and self-care. Other researchers have used this measure in their work because they argue it reflects the rather unique application of coping in emergency service workers (Armstrong et al, 2014). However, the fact that such measures were discounted reflects the theoretical position of the thesis in that it is aims to explore the experiences of growth, using a sample of Fire and Rescue Service workers because of their potential exposure to trauma, rather than exploring

134

The Fire and Rescue Service more specifically. In addition, it was also felt that using scales designed specifically for use within emergency service workers may restrict the generalisability of the results of the study.

6.3 Scales Used in Study Two
This section provides a brief description of each of the measures used in study two, together with their psychometric properties and a brief rationale as to why they were chosen.

6.4 Measures of Mindset
Mindset was a conceptual category that emerged from study one, and reflects an individual's characteristics and their psychological positioning.

Personality
The Big-Five framework is a hierarchical model of personality traits with five broad factors (Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness) and has become the most widely used and extensively researched model of personality (McCrae & Costa, 1999). The Five Factor model has been used in previous research with firefighters, for example, Fannin and Dabbs (2003) and it has also been used by Wagner et al. (2009) to address the question of the existence of a rescue personality (this is also one of the questions to be addressed by this thesis - see 1.3). The most comprehensive measure of the Big Five model is The NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992), which was used in the original validation of The Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996). This measure has demonstrated good psychometric properties (reliability alpha coefficients ranging from .68 to .86 (Costa & McCrae, 1992) but with 240 items was thought to be too lengthy for this research given the number and length of other measures to be included. A shortened version of this, The NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992), comprising of 60 items, five 12 item scales, was considered more appropriate for this research. This scale also demonstrated good psychometric properties (reliability alpha coefficients ranging from .76 to .90, Costa & McCrae, 2003). Each item is rated on a five point Likert scale (1 = strongly disagree; 5 = strongly agree).

However, the cost of purchasing this scale was prohibitive and therefore items were selected from The International Personality Item Pool (IPIP), a public domain collection of items for use in personality tests. The IPIP was originally introduced by Goldberg (1999) as a scientific collaboration intended to free personality researchers from constraints previously imposed upon them by copyrighted personality inventories (Goldberg et al, 2006). Items can be easily accessed from the IPIP web site at http://ipip.ori.org/ and researchers are free to use these items in any way they wish (Goldberg et al, 2006). Initially the IPIP had 1252 items but this has now grown to over 2,000 items (Ibid). As well as single items, IPIP scales have been designed to serve as proxies for the major commercial inventories, such as the NEO-PI-R (Costa & McCrae, 1992), which was used in the current study. The procedure that Goldberg (1999) used to construct these scales is described in Goldberg et al. (2006) and the coefficient alphas and correlations with the NEO-PI-R (Costa & McCrae, 1992) presented in

Table 6.1.2 are those obtained by Goldberg (1999). The resulting measure, used in the current study, consisted of 50 items, ten items for each of the five factors, five of which are keyed in a positive direction and a negative direction and negatively worded items are reversed coded before scoring. Scoring was done on a five point Likert scale reflecting the scoring of the NEO-PI-R (Costa & McCrae, 1992) as detailed above. Table 6.1.2 shows the coefficient alphas for the IPIP scale that was used and the correlations with the NEO-PI-R

Table 6.1.2

Coefficient Alphas for 50-item IPIP Representation of the NEO-PI-R and Correlations with NEO-PI-R

	Coefficient Alpha	Correlation with NEO-PI-R
Neuroticism	.86	.82
Extraversion	.86	.77
Openness to Experience	.82	.79
Agreeableness	.77	.70
Conscientiousness	.81	.79

Discounting brief measures of personality.

Given that the potential length of the resulting questionnaire could be problematic in terms of participant fatigue consideration was given to using a brief measure of personality, for example, The Five-Item Personality Inventory (FIPI; Gosling, Rentfrow, & Swann, 2003). However, such short measures are often subject to serious limitations and compared with standard multi-item measures of the Big Five, the FIPI is less reliable, converges less strongly with the other Big-Five measures and has weaker correlations with other variables (Gosling et al, 2003). Therefore, it was felt that the psychometric cost of using such a measure was too great.

Secondly using single item measures could be problematic with analyses involving latent variables such as structural equation modelling, which, was intended to be used, in phase two of the research project. Structural equation modelling estimates the error terms with which latent variables are measured by using multiple indicators of the same latent variable. As single-item measures provide only a single estimate of the latent variable error terms would need to be estimated by other means (Gosling et al, 2003).

Optimism

The Life Orientation Test (LOT; Scheier & Carver, 1985) is the most commonly used instrument to measure dispositional optimism (Burke et al, 2000) and was the measure used by Tedeschi & Calhoun (1996) in their model of posttraumatic growth. In reviewing the wider existing literature, it was found to be by far the most predominant model.

The Revised Life Orientation Test (LOT-R; Scheier et al, 1994) is a revised version of the Life Orientation Test, revised in order to improve predictive validity. It is a 10 item (six target

items and four fillers) self-report measure designed to assess dispositional optimism. Three items each are keyed in a positive and a negative direction and negatively worded items are reversed coded before scoring. It is scored in the format of a five point Likert scale (0 = strongly disagree; 4 = strongly agree) with a potential range of scores from 0-24, with higher scores indicating higher optimism. Sample items include "In uncertain times, I usually expect the best" and "I'm always optimistic about the future". The LOT-R (Scheier et al, 1994) has an acceptable level of internal consistency, an alpha coefficient of .78 was reported and acceptable test-retest reliability of .60-.79 (Scheier et al, 1994).

Resilience

In reviewing the literature, it became apparent that there are a large numbers of scales available to measure resilience (see Windle, Bennett, & Noyes, 2011) for a comprehensive review of 15 of these measures). On reviewing the psychometric properties three scales remained, The Brief Resilience Scale, (Smith et al, 2008); The Resilience Scale for Adults, (Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003) and The Connor-Davidson Resilience Scale, (Connor & Davidson, 2003). However, The Brief Resilience Scale was eliminated on the basis that it was designed as an outcome measure to assess the ability to bounce back or recover from stress whereas the other two scales provide an understanding of the personal qualities that enable individuals to bounce back from adversity, which aligns more closely with the theoretical construct of mindset. An additional consideration throughout the process of scale selection was the possibility of participant fatigue given the large number of measures that were being used and thus the number of items in the two remaining scales was considered. The Connor-Davidson Resilience Scale (Connor & Davidson, 2003) has 25 items whereas The Resilience Scale for Adults (Friborg et al, 2003) has an additional 12 items making a total of 37. Also in reviewing the literature on resilience and posttraumatic growth, The Connor-Davidson Resilience Scale (Connor & Davidson, 2003) appeared to be the measure that was most widely used. It has also been used within a wide range of populations, from general to clinical and also firefighters (for example; Peng et al, (2012), medical students; Krystal et al, (2014) military veterans and Lee, Ahn, Jeong, Chae, & Choi, (2014) firefighters). Therefore, The Connor-Davidson Resilience Scale (Connor & Davidson, 2003) was the scale that was chosen.

The Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson 2003) is a 25 item self-report measure designed to assess resilience and is based on how a participant has felt over the last month. However, if a particular situation has not arisen within this time then the response should be determined by how the participant thinks they would have reacted. It is scored in the format of a five point Likert scale (0 = the statement is not true at all; 4 = the statement is true nearly all of the time). The scoring is based on summing the total of all items and therefore the potential range of scores is from 0-100, higher scores indicating greater resilience. Sample items include "I am able to adapt to change when changes occur" and "have at least one close and secure relationship that helps me when I am stressed". The scale has five subscales personal competence, trust in one's instincts, positive acceptance of

change, control and spiritual influences. However, the authors do not recommend separate scoring of these as the factor structure and mean scores varies with setting. The Connor-Davidson Resilience scale has good internal reliability, an alpha coefficient of .89 was reported and good test-retest reliability of .87 (Connor & Davidson, 2003).

Training/Work Preparedness

This was the most difficult category to operationalize as no measures were found that fitted well with the theoretical model. Participants in study one spoke about the training that they received and the extent to which they felt that it prepared them for dealing with traumatic incidents, which they would likely encounter, in their role as an operational firefighter. Participants felt that whilst the training they received was good ultimately nothing could fully prepare them for what they would experience when dealing with traumatic incidents. Therefore, the relationship between the extent to which participants felt that their training prepared them for dealing with traumatic incidents whilst working as an operational firefighter and posttraumatic growth was one that it was felt needed to be explored.

Although scales do exist which are designed to measure work preparedness such as The Work Readiness Scale (WRS; Caballero, Walker, & Fuller-Tyszkiewicz, 2011) this was designed specifically to assess work readiness in graduates and is rather long for the purposes of this research having 64 items. In a study carried out by Martin (1989) assessing gender differences in salary expectations participants were given a four-part questionnaire, the second part of which assessed work preparedness using a one Likert-type question asking "how well participants felt their background and training had prepared them for the work to be done in their field of interest". Potentially responses ranged from 1 = not at all well prepared to 7 = extremely well prepared. Thus, this question was adapted to read "I would like you to think about the extent to which you feel that your training prepared you for the work that you do within the Fire and Rescue Service. Please indicate the statement which you think best refers to you" and responses were scored in line with the above. Therefore, this is not a validated measure and whilst being cognisant of the psychometric costs of using a single item (see Furr, 2011 for a full discussion of this) it was felt that it fitted well with the participants data from study one and could potentially elucidate any relationship between work preparedness and posttraumatic growth.

Well-Being

Well-being was the last variable to be measured in the questionnaire and although this was conceptualised in this thesis as being part of mindset this reflects the position in the literature in which it is often conceptualised as an outcome variable (Carver & Antoni, 2004).

Reviewing the literature revealed a large number of scales designed to measure well-being (see Linton, Dieppe, & Medina-Lara, (2016) for a review of 99 self-report measures of well-being), however there is a great deal of variability in the dimensions of well-being used between these scales reflecting the differing perspectives on the topic (Linton et al, 2016).

The Ryff Scales of Psychological Well-Being (PWBS; Ryff, 1989) was chosen, as it is robust and theoretically grounded scale that specifically focuses on measuring multiple facets of psychological well-being, thereby providing a comprehensive assessment of well-being. It was also felt that the six dimensions of the scale provided a good fit with the data obtained from study one. This scale has also shown good reliability in both emergency responders (Shakespeare-Finch, Rees, & Armstrong, 2015) and firefighter samples (Lambert, Benight, Harrison, & Cieslak, 2012).

Some of the other available scales were rejected on the basis that they had not been developed from a theoretical model, for example The Perceived Well-Being Scale (PWB; Reker & Wong, 1984). Given that the length of the resulting questionnaire was always a consideration shorter instruments were considered such as The Warwick-Edinburgh Mental Well-being Scale (WEMWBS; Tennant et al, 2007) consisting of only 14 items. However, it was felt that this conception of well-being was too narrow focusing entirely on positive aspects of mental health.

The Ryff Scales of Psychological Well-Being (Ryff, 1989) is available in either an 84 or 54-item self-report measure designed to assess an individual's psychological well-being at a particular moment in time. For reasons of brevity, the decision was taken to use the 54-item measure. An 18-item measure is also in existence, which was developed for national telephone surveys, but this has low internal consistency and because of this is not recommended by the author for high-quality assessment of psychological well-being. The 54 item measure is scored in the format of a six point Likert scale (1 = strongly disagree; 6 = strongly agree) and sample items include "Most people see me as loving and affectionate" and "In general I feel confident and positive about myself". The scale has six subscales; autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self- acceptance each consisting of nine items each. Items from the separate scales are mixed and approximately half the items are reverse coded before the scores are summed on each of the six subscales. Higher scores indicate higher self-ratings on the assessed dimension but Ryff (1989) suggests that there is no specific cut off points for defining high or low well-being but instead those distinctions are best derived from distributional information from the data collected using the 25% and 75% quartiles. Alternatively, she suggests that high well-being could be defined as scores that are 1.5 standard deviations above the mean, whereas low well-being could be scores that are 1.5 standard deviations below the mean. The scales had good internal reliability alpha coefficients ranging from between .85 to .91 (Ryff, 1995).

6.5 Measures of The Event
This conceptual category identified in study one relates to the experience of a potentially traumatic event and the degree to which such an event disrupts an individual's assumptive world. Researchers theorise that there should be a strong positive relationship between the

extent of disruption of core beliefs and the degree of posttraumatic growth (Cann et al, 2010).

There is one measure which is designed to assess an individual's current beliefs about their assumptive world, World Assumptions Scale; Janoff-Bulman, (1989). However, The Core Beliefs Inventory (CBI; Cann et al, 2010) is the only scale that measures the degree to which a broad core of assumptions that constitute an individual's assumptive world is threatened or disrupted by specific life events.

The Core Beliefs Inventory (CBI; Cann et al, 2010) is a nine item self-report measure designed to measure the degree to which a specific traumatic event challenged participant's core beliefs about the world. It is scored in the format of a six point Likert scale (0 = beliefs were not at all challenged; 5 = beliefs were challenged to a very great degree) with a potential range of scores from 0-45, higher scores indicating a greater challenge to participant's core beliefs about the world. Sample items include "Because of the event, I seriously examined the degree to which I believe things that happen to people are fair". The Core Beliefs Inventory has good internal reliability, an alpha coefficient of .82 was reported and acceptable test-retest reliability of .69 (Cann et al, 2010).

6.6 Measures of Traumatic Reactions

The Posttraumatic Diagnostic Scale (PTDS; Foa et al, 1997) was used in study one but was out of print at the time of study two as it had been replaced by The Posttraumatic Diagnostic Scale for the DSM − 5 (PDS-5; Foa et al, 2016).

The Posttraumatic Diagnostic Scale for DSM-5 (Foa et al, 2016) is a 24 item self-report measure designed to assess PTSD symptom severity in the last month according to DSM-5 criteria. The questionnaire begins with two trauma screening questions meant to assess the respondent's trauma history and to single out the traumatic event that currently bothers them the most or that gets in the way of their life the most and that they have the most upsetting and unwanted thoughts about (the "index trauma"). The following 20 questions assess the presence and severity of the PTSD symptoms in relation to the index trauma. These symptom questions are based on the DSM-5 symptoms clusters of intrusion, avoidance, changes in mood and cognition and arousal and hyperactivity, which form four subscales. The symptom items are rated on a five point Likert scale of frequency and severity rating from 0 (not at all) to 4 (6 or more times a week/severe). Potential scores range from 0-80 with a score of 28 being used as a cut-off point for possible diagnosis of PTSD, scores between 0-27 suggesting no diagnosis and 28-80 suggesting probable diagnosis. An additional four items ask about distress and interference caused by PTSD symptoms as well as the onset and duration of symptoms. The PDS-5 has excellent internal consistency with an alpha coefficient of .95 for the full scale with the internal consistency of the subscales ranging from acceptable to excellent (avoidance = .75, arousal = .84, changes in cognition and mood = .89 and intrusion = .90). The test-retest reliability for the PDS-5 total score was excellent, .90 with test-retest reliability of the subscales ranging from

adequate to good, avoidance = .73, intrusion = .85, alterations in cognition and mood = .85, arousal = .86 (Foa et al, 2016).

In an attempt to ensure that participants focused only on events within their working life, within the introduction to the scale the phrase, "For the purposes of this study please only consider events that you have experienced during your work in the Fire and Rescue Service" was added in bold.

One question was added at the end of this scale which, asked participants to report how long ago the traumatic incident occurred in years and this reflected the suggestion in the literature that time since the event may have an impact on the amount of posttraumatic growth experienced (Cordova et al, 2001).

6.7 Measures of Posttraumatic Growth

The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) was chosen for study one because of its good psychometric properties but also because it is the most widely used measure of posttraumatic growth (Ramos & Leal, 2013). It has also shown strong internal reliability within samples of emergency workers (Shakespeare-Finch et al, 2003; Kirby et al, 2014). This was also used in study two. A full discussion on the psychometric properties of this scale was provided in 5.2.

6.8 Measures of Coping

Whilst reviewing the literature it became apparent that there was a plethora of measures available to measure coping (see Schwarzer & Schwarzer, 1996 for a critical review of coping instruments). However, as coping was theorised to be an important factor in the model of growth it was considered important to select a measure of coping that captured as many potential coping responses as possible. Some of the other available coping measures were considered and rejected on the basis that they did not capture this diversity. For example, The Ways of Coping Questionnaire (WCQ; Folkman & Lazarus, 1980, 1985) assessed only eight types of coping classified into two broad categories; problem-focused and emotion focused. However, this does not include humour, for example, which participants in study one articulated as a means of coping with traumatic events.

The dispositional version of the COPE Inventory (Carver et al, 1989) was used as it has been developed from a sound theoretical model and is a 60 item multidimensional self-report measure designed to assess the different ways in which people respond to difficult or stressful events in their lives. Participants are asked to indicate what they usually do. It is scored in the format of a four point Likert scale (1= I usually do not do this at all; 4= I usually do this a lot). There are 15 scales (each consisting of four items) designed to assess 15 conceptually distinct methods of coping; positive reinterpretation and growth, mental disengagement, focus on and venting of emotions, use of instrumental social support, active coping, denial, religious coping, humour, behavioural disengagement, restraint, use of emotional support, substance use, acceptance, suppression of competing activities and

planning. Items are summed to give totals for each of the 15 scales. With the exception of mental disengagement (alpha coefficient .45), the scales demonstrated good internal reliability with alpha coefficients ranging from between .62 to .92 (Carver et al, 1989).

6.9 The Resulting Questionnaire Pack

As a result of the mapping process outlined above a total of nine measures were selected collectively consisting of 257 items. A demographic section was then inserted at the beginning of the questionnaire consisting of a further 10 items. Thus, the full questionnaire pack contained 267 questions (excluding the unique identifier requests and the consent/ submission requests) and was 41 pages long (see appendix one for the online questionnaire).

Consideration was given to undertaking a pilot study of the questionnaire in order to test how the measures performed in a sample of firefighters but due to the time scales involved it was decided that this was not feasible. Additionally given the diligence that had been exercised when selecting the measures this was not considered a priority but instead just needed to see how the running order and overall questionnaire pack was experienced. Thus, the questionnaire was completed by the supervision team, family members and a retired firefighter to ensure that the questions and response formats, information sheets, debrief sheets and consent sections were clear and understandable. These individuals were also asked to time themselves in order that the advert which would be produced detailing the research could accurately reflect the amount of time it would be likely to take to complete the survey.

No changes were made to the questionnaire pack as a result of this process and the online questionnaire was put on SurveyGizmo, chosen because of the save and return option. (see 7.2). In ordering the questionnaire, consideration was given as to how to ensure clarity for the participants and the resulting survey generally followed the grounded theory model that had been developed. The most important consideration was the position of the measure of traumatic reactions (PDS-5; Foa et al, 2016)) as this was the most sensitive measure used. In line with recommendations, this appeared at roughly midway through the questionnaire (Nardi, 2014).

7.0 Conclusion to Chapter.

This chapter has outlined the process that was undertaken and the considerations that were made when mapping the grounded theory model of growth, developed in Chapter five, onto the conceptual model. At the end of this process, appropriate scales had been chosen that could then be used to test the model within a large sample of Fire and Rescue Personnel, which constitutes study two in this thesis. The next empirical chapter will outline and discuss the results of study two.

Chapter Seven: Empirical Study Two - Quantitative Study

7.1 Introduction to Chapter

This chapter will explore study two and details the actions taken, from recruitment of participants, through the process of data cleaning to reporting descriptive and inferential statistics, which were used to address some of the research questions set out at the beginning of this thesis (see 1.3).

As can be seen in the introduction these research questions are clustered into three main groups. The first group (labelled A) consists of questions which centre on the prevalence and nature of posttraumatic growth in this population. Organismic Valuing Theory of growth (Joseph & Linley, 2005) posits that posttraumatic stress is the catalyst for posttraumatic growth and therefore these research questions seek to address whether there is posttraumatic stress and posttraumatic growth within this sample, and whether posttraumatic growth can occur without posttraumatic stress. Also within this cluster are questions about whether posttraumatic growth is cumulative, as the very nature of firefighting work means that this population may be exposed to multiple traumatic incidents through their careers (Wagner et al, 2010) and whether posttraumatic growth is an enduring phenomenon. A further question seeks to identify any sex differences in this population as previous research has found significant sex differences in posttraumatic growth with women reporting higher levels of growth than men (Tedeschi & Calhoun, 1996). A full review of the research investigating sex differences was provided in section 3.4.

The second group of research questions (labelled B) seek to address longitudinal and temporal aspects of posttraumatic growth. This includes questions about disaggregating posttraumatic growth from naturally occurring growth across a lifespan and posttraumatic growth attributable to working within the Fire and Rescue Service as opposed to as a result of engaging with traumatic incidents. The question as to whether there is a rescue personality, as suggested by Mitchell and Bray (1990), (a full discussion of this debate was provided in section 3.13) sits within this group as does which personality factors are associated with posttraumatic growth (previously discussed in sections 3.3 and 3.13). The last question within this group seeks to identify whether time since the traumatic event has any influence on posttraumatic growth within this population, as although this has previously been examined within the literature findings in this area are inconsistent (see section 3.8 for a full review).

The last group of research questions (labelled C) focuses on the relationship between posttraumatic growth and other constructs, which have been documented within the existing literature. These include coping strategies, well-being and resilience, which were reviewed in sections 3.7, 3.9, 3.6 respectively. However, perhaps the most significant question within this group relates to the relationship between posttraumatic growth and

the disruption of core beliefs as accumulating evidence has suggested that the challenge to one's assumptive world is the main predictor of posttraumatic growth (Cann et al, 2010).

7.2 Participants

Participant recruitment

Participant recruitment took place over a six-month period From January to July 2016 and in order to reach the maximum number of potential participants a multipronged recruitment strategy was pursued. Firstly, a member of the Chief Fire officers Association (CFOA) was contacted to request their assistance in recruiting participants. The potential aims and benefits of the research were outlined with the request to place an advert for participation on the intranet sites of the Regional Fire and Rescue Services. A chief Fire Officer from CFOA, whom had been previously contacted also included a letter of endorsement and sent this to fellow Chief Fire Officers asking them to contact the researcher directly in order to assist with the study. However, this elicited a disappointing response and only four regional Fire and Rescue Services contacted the researcher, agreeing to advertise the survey.

Contact details of all Chief Fire Officers in England, Scotland, Northern Ireland and Wales were obtained by searching the internet and then attempts made to contact them by phone. In some regions, the Chief Fire Officers were spoken to directly, whilst in other regions it was not possible as their calls were intercepted by their personal assistants. However, in both cases introductions were made, the potential aims and benefits of the research outlined together with a request for help in publicising the survey. This was a lengthy and protracted process, which took place over the course of a six month period. At the time there were 53 regional Fire and Rescue Services within the UK to find the relevant contact details for and generally once this was done a number of calls were needed before the correct person was located. In the majority of cases, the individuals requested further written information about the research and this was then subsequently sent by email. Some regional Fire and Rescue Services responded to the requests by agreeing to participate straight away whilst others forwarded the details to their Occupational Health departments, some of which requested more information and others required meetings in order to discuss the research further before agreeing to participate. Even after agreement to participate had been secured, however, there was often a delay in actually advertising the survey due to factors such as operational requirements and the availability of space in internal communications. However, pursuing this strategy elicited responses from a further 22 Fire and Rescue Services who agreed to post links to the survey on their intranets and other internal communications.

At the same time contact details were obtained for The Firefighters Charity, The Fire Brigades Union and Women in The Fire Service UK and individuals within these organisations were also approached and asked to assist in publicising the research. A presentation was also given at The Fire Brigades Union National Women's Annual Conference, where contact details were obtained for potential participants.

Secondly, snowball sampling was also used with participants from study one being contacted and invited to participate in study two. They were emailed the survey link and asked to forward this to colleagues and friends within the Fire and Rescue Service. Paper copies of the questionnaire were also offered and this resulted in face-to-face data collection being undertaken at two fire stations within the Midlands.

Although recruitment was a timely and somewhat difficult process it did result in a wide geographic distribution of participants as firefighters responded from the North (FS1), North West (FS2), North East (FS3), West (FS4), East (FS5), Midlands (FS7), South West (FS8) and South East (FS9) areas of the UK.

The only inclusion criteria for participants was that they were a serving member of the UK Fire and Rescue Service. As the research sought to focus only on trauma encountered in their role as a member of the Fire and Rescue Service, when completing the online questionnaire participants were asked to include only traumatic events that they had experienced as part of their working lives.

Sample

As the questionnaire was put on SurveyGizmo, participants had the opportunity to save and return to the survey when convenient for them. It was hoped that this would aid in maximising participation given the length of the survey and the possibility that participants could be interrupted by a call out at any time if they were completing the survey during working hours. Conversely, however, this also meant that participants were able to start the survey but not return to it and a large number of participants either did this or completed only a few questions on the first measure used. Of the total number of responses, which was 579, 248 of these were only partially completed. Partially completed was defined as respondents that had completed less than 25% of the questionnaire and thus, these were excluded from data analysis.

Participants were aged between 22 and 58, with a mean age of 43.3 (std.7.9), 297 participants were male and 29 female (five did not wish to answer). 298 participants were wholetime firefighters and 29 were retained firefighters (four did not wish to answer). The participants had lengths of service from one year to 34 years, with a mean length of service of 18.5 years (std.7.8). Although this mean length of service may appear high cuts to the Fire and Rescue Service have resulted in relatively low levels of recruitment in recent years. Additionally, although at the time of writing this is changing somewhat, traditionally the Fire and Rescue Service was considered a job for life and a high proportion of personnel joined in early adulthood and left on retirement. 269 participants were married or living with a partner, 26 participants were single, 19 participants were divorced, 10 participants were separated, one participant was widowed (six did not wish to answer). Participants had a mean of 1.64 (std. 1.20) children. Table 7.2.1 below provides details of the participant's roles within the Fire and Rescue Service.

Table 7.2.1

Participants Working Status for Study Two

Role	Frequency
Firefighter	117
Crew Manager	68
Watch Manager	82
Station Manager	42
Group Manager	15
Area Manager	5
Assistant Chief Fire Officer	0
Deputy Chief Fire Officer	0
Chief Fire Officer	2
Total	331

7.3 Materials

Evaluation of reliability of scales and subscales

The reliability scores for each of the scales/subscales are reported below. Ideally the Cronbach alpha coefficient of a scale should be above 0.70 (DeVellis, 2012), and the majority of scales/subscales met this criteria demonstrating a good level of internal reliability for this population. The only exceptions to this were the Personal Strength subscale of the Posttraumatic Growth Inventory and the coping scales of Denial and Mental disengagement. Consideration is given to the possible reasons for this and as these were scales consisting of a small number of items the mean inter-item correlation values are also reported.

Personality

The Revised NEO Personality Inventory (Costa & McCrae, 1992) measures personality in terms of five basic dimensions, Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness. Table 7.3.1 details the Cronbach alpha coefficients for the 50-item IPIP representative of the NEO-PI-R (Costa & McCrae, 1992)that were used in the current study and evaluations by Goldberg (1999).

Table 7.3.1

Cronbach Alphas for the 50-item IPIP Representation of the NEO-PI-R

	Current Study	Goldberg (1999)
Neuroticism	0.91	0.86
Extraversion	0.90	0.86
Openness to experience	0.78	0.82
Agreeableness	0.82	0.77
Conscientiousness	0.87	0.81

Optimism

The Life OrientationTest-Revised (Scheier et al, 1994) has acceptable internal consistency, with a Cronbach alpha coefficient of 0.78. For this study the Cronbach alpha coefficient was 0.85 with a mean of 2.35 (0.17).

Resilience

The Connor-Davidson Resilience Scale (Connor & Davidson, 2003) has good internal consistency with a Cronbach alpha coefficient of 0.89. For this study the Cronbach alpha coefficient was 0.92 with a mean of 2.82 (0.47).

Well-Being

The Ryff Scales of Psychological Well-Being (Ryff, 1989) is a multidimensional measure consisting of six subcales. Table 7.3.2 details the coefficient alphas for these six subscales within this study and the original scale validation paper (Ryff, 1989).

Table 7.3.2

Cronbach Alphas for the Ryff Scales of Psychological Well-Being

	Current Study	Ryff, 1989
Autonomy	0.77	0.83
Environmental mastery	0.88	0.86
Personal growth	0.85	0.85
Positive relations with others	0.87	0.88
Purpose in life	0.86	0.88
Self-acceptance	0.92	0.91

Posttraumatic Stress

The Posttraumatic Diagnostic Scale for DSM-5 (Foa et al, 2016) has excellent internal consistency with a Cronbach alpha coefficient of 0.95 for the full scale. For this study, the Cronbach alpha coefficient was also 0.95 with a mean of 0.55 (0.21). However, there are four subscales within this scale and Table 7.3.3 shows the coefficient alphas for these within this study and original scale validation paper (Foa et al, 2016).

Table 7.3.3

Cronbach Alphas for the Posttraumatic Diagnostic Scale for DSM-5

	Current Study	Foa et al. (2016)
Intrusion	0.88	0.90
Avoidance	0.74	0.75
Changes in cognition and mood	0.90	0.89
Arousal and hyperactivity	0.87	0.84

Disruption of Core Beliefs

The Core Beliefs Inventory (Cann et al, 2010) has good internal consistency with a Cronbach alpha coefficient of 0.82. For this study, the Cronbach alpha coefficient was 0.92 with a mean of 1.63 (0.30).

Posttraumatic Growth

The Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996) has good internal consistency with a Cronbach alpha coefficient of 0.90. For this study the Cronbach alpha coefficient was 0.95 with a mean of 1.16 (0.45). However, there are five subscales within this scale and Table 7.3.4 shows the coefficient alphas for these within this study together with those reported in the original scale validation paper (Tedeschi & Calhoun, 1996).

Table 7.3.4

Cronbach Alphas for the Posttraumatic Growth Inventory

	Current Study	Tedeschi and Calhoun (1996)
New possibilities	0.88	0.84
Relating to others	0.90	0.85
Personal strength	0.85	0.72
Spiritual change	0.63	0.85
Appreciation of life	0.81	0.67

Although the original scale validation work reported good reliability for the dimension of spiritual change the current study reported only 0.63. It is possible that this result is due to having only two items in the scale as Cronbach alpha values are sensitive to the number of items in a scale. The mean inter-item correlation value is 0.31, which falls within the recommended optimal range of 0.2 to 0.4 (Briggs & Cheek, 1986).

Coping

The COPE Inventory (Carver et al, 1989) is a multidimensional measure consisting of 15 subscales. The alpha coefficients from the original scale validation paper (Carver et al, 1989) are detailed in Table 7.3.5 together with the alpha values from the current study. No Cronbach alphas were reported for Substance use and Humour in the original study, which detailed the development of the COPE (Carver et al, 1989) and the subscale Humour was only added to the inventory after its initial publication. However, the Cronbach alphas for Substance use and Humour reported in Table 7.3.5 were taken from Khan (2013).

Table 7.3.5

Cronbach Alphas for the Cope Inventory

	Current Study	Carver et al. (1989)
Active coping	0.78	0.62
Planning	0.87	0.80
Suppression of competing activities	0.70	0.68
Restraint coping	0.75	0.72
Use of instrumental social support	0.83	0.75
Use of emotional social support	0.91	0.85
Positive reinterpretation and growth	0.72	0.68
Acceptance	0.76	0.65
Religious coping	0.94	0.92
Focus on and venting of emotions	0.80	0.77
Denial	0.60	0.71
Behavioural disengagement	0.76	0.63
Mental disengagement	0.54	0.45
Substance use	0.97	* 0.94
Humour	0.92	* 0.88

As can be seen from Table 7.3.5 the Cronbach alpha for mental disengagement was poor. One possible explanation of this could be due to scale length (only four items) and the sensitivity of Cronbach alpha values to the number of items in a scale. However, Carver et al. 1986, reported that lower reliability on this scale was not unexpected as this scale differs from the others in that it is a 'multiple act criterion', meaning that the tactics that reflect mental disengagement are more diverse than those that make up the other coping strategies. However, the mean inter-item correlation value in the current study is 0.23, which falls within the recommended optimal range of 0.2 to 0.4 (Briggs & Cheek, 1986).

Denial was the other scale that had a particularly low alpha coefficient. However, given that there are only four items in this scale it may again be appropriate to look at the mean inter-item correlation value in the current study which was 0.32 and again falls within the recommended optimal range of 0.2 to 0.4 (Briggs & Cheek, 1986). Nevertheless, caution should be extended when interpreting the results from either of these subscales.

7.4 Design and Procedure

Data Cleaning
Five completed responses from control staff and one participant who described his employment status as ex-ops were removed from the data set. These cases were removed as the research sought to focus on the experiences of operational firefighters, whose daily working lives put them at risk of experiencing potentially traumatic events. Whilst control staff may well be exposed to traumatic events, it is likely that this exposure will be vicarious. (see 3.1).

Alterations to Variables

Question two was recoded during the data cleaning process. "What is your role within the Fire and Rescue Service?" was originally a string item; data was converted to scale data akin to the nine roles within the Service (1 being the lowest role of firefighter and 9, Chief Fire Officer). Guidance was sought on this to ensure that these were mapped correctly. As this was a string item, a number of participants entered both their whole time and their retained roles. These responses were recoded according to their whole time roles. Items which elicited responses that were between 0-1, such as "in years how long ago did the traumatic incident occur", were rounded to one.

Missing Value Analysis

As the questionnaire contained items, which, could be considered sensitive each of the items had a "do not wish to answer" option and all of these were coded as missing within the analysis.

Assessing missing values showed that there were very few and these seemed to be scattered randomly throughout the data (see Table 7.4.1), suggesting that they were not problematic (Tabachnick & Fidell, 2014). However, within the measure of personality there were two items, which had a relatively high number of missing responses. These were item number 33 "I tend to vote for liberal political candidates" and item 40 "I tend to vote for conservative political candidates". Whilst this may suggest that some participants were not comfortable disclosing their political leanings it could be that these questions actually reflect the US culture, in which the measure was developed. These were the only two questions within the measure about politics and as there was no question about labour political candidates it may be that these questions did not make sense to this UK sample.

The question about how long ago the traumatic incident occurred had the highest percentage of missing values within the analysis. This does not appear to be a particularly sensitive question and therefore this may be due to the positioning within the questionnaire. It was situated directly after the measure of PTSD following on from questions about the severity of symptoms of posttraumatic stress and thus it may be that participants simply missed the question or those to whom these questions did not apply moved onto the next measure.

Table 7.4.1

Missing values for variables in Study Two

Construct Measured	Percentage of Missing Values
Personality	1.68%
Optimism	0.96%
Resilience	0.60%
Training/Work preparedness	0.60%
Posttraumatic stress	3.69%
Time since traumatic event	14.20%
Disruption of core beliefs	3.52%
Posttraumatic growth	4.40%
Coping	2.85%
Well-being	1.25%

Consideration was given to the various methods of estimating missing data such as replacing with the item mean option. However, although this is considered to be a conservative approach it carries with it the possibility of a reduction in the variance and potential distortion of the analysis (Tabachnick & Fidell, 2014). Thus given the small amounts of missing data and the relatively large sample size the exclude cases pairwise option was chosen for the statistical analysis as recommended by Pallant (2013). Selecting this option did not significantly reduce the sample size, with subsequent regression analysis investigating the relationship between personality and posttraumatic growth, coping and posttraumatic growth and well-being and posttraumatic growth all having adequate sample size (325, 318 and 324 respectively).

7.5 Results and Discussion

Descriptive statistics

Assessing Normality

Screening for normality was undertaken using descriptive statistics. Descriptives, Extreme values, Tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk), Histograms, Normal Q-Q plots, Detrended Normal Q-Q Plots and Boxplots were examined for each of the scales. Discussions are provided in the relevant sub-sections where issues with normality were identified. Table 7.5.1 details the scale means and standard deviations together with measures of normality for the variables in study two.

Table 7.5.1

Scale Means, Standard Deviations and Measures of Normality for Study Two

	Construct	N	Mean (SD)	Scale range	Skew	Kurtosis	K-S	Comments
	Optimism	331	13.97 (5.32)	0-24	-.268	-.470	.000	Negative, flat distribution. No outliers suggested by boxplot.
	Resilience	331	69.93 (13.98)	0-100	-.681	.378	.000	Negative, peaked distribution. Boxplot suggests 4 outliers.
	Training/Work preparedness	329	5.10 (1.35)	1-7	-1.170	1.082	.000	Negative, peaked distribution. Boxplot suggests lots of outliers (10 outliers and 1 extreme outlier)
	Posttraumatic Stress	331	10.48 (12.53)	0-80	1.829	3.775	.000	Positive, peaked distribution. Boxplot suggests lots of outliers (10 outliers and 3 extreme outliers)
	Time since event	284	7.27 (7.34)	1-35	1.387	1.391	.000	Positive, peaked distribution. Boxplot suggests 11 outliers
	Disruption of core beliefs	331	14.08 (12.08)	0-45	.556	-.733	.000	Positive, flat distribution. No outliers suggested by the boxplot.
	Posttraumatic growth	331	22.94 (21.42)	0-105	1.002	.169	.000	Positive, peaked distribution. Boxplot suggests 2 outliers
P	Neuroticism	331	25.53 (8.12)	10-50	.221	-.261	.000	Positive, flat distribution. Boxplot suggests 3 outliers
E R S	Extraversion	331	32.99 (7.27)	10-50	-.480	.666	.006	Negative, peaked distribution. Boxplot suggests 1 outlier and 1 extreme outlier.
O N A L	Openness to experience	331	34.15 (6.23)	10-50	-.499	2.340	.007	Negative, peaked distribution. Boxplot suggests 2 outliers, 1 of which is extreme
I T y	Agreeableness	331	35.26 (5.89)	10-50	-.663	3.073	.037	Negative, peaked distribution. Boxplot suggests 3 outliers, 1 of which is extreme
	Conscientiousness	331	36.18 (6.74)	10-50	-.769	2.082	.000	Negative, peaked distribution. Boxplot suggests 3 outliers, 1 of which is extreme

		N	Mean (SD)	Range	Skewness	Kurtosis		Description
W E L L - B E I N G	Autonomy	331	39.79 (7.45)	9-54	-.792	2.639	.018	Negative, peaked distribution. Boxplot suggests 5 outliers, 1 of which is extreme
	Environmental mastery	331	39.21 (8.49)	9-54	-.825	.836	.000	Negative, peaked distribution. Boxplot suggests 2 outliers
	Personal growth	331	40.61 (8.17)	9-54	-.708	1.270	.002	Negative, peaked distribution. Boxplot suggests 2 outliers
	Positive relations With others	331	37.37 (9.69)	9-54	-.338	-.229	.000	Negative, flat distribution. Boxplot suggests 1 outlier
	Purpose in life	331	38.45 (8.50)	9-54	-.625	.829	.001	Negative, peaked distribution. Boxplot suggests 2 outliers
	Self-acceptance	331	37.84 (10.18)	9-54	-.715	.077	.000	Negative, peaked distribution. Boxplot suggests 1 outlier
C O P I N G	Positive reinterpretation and growth	331	9.61 (3.14)	4-16	-.249	-.043	.000	Negative, flat distribution. No outliers suggested by boxplot
	Mental disengagement	331	7.42 (2.72)	4-16	.367	.208	.000	Positive, peaked distribution. Boxplot suggests 1 outlier
	Focus on and Venting of emotions	331	6.61 (2.93)	4-16	.901	.402	.000	Positive, peaked distribution. Boxplot suggests 4 outliers
	Use of instrumental social support	331	7.30 (3.17)	4-16	.635	-.028	.000	Positive, flat distribution. Boxplot suggests 3 outliers
	Active coping	331	8.41 (3.29)	4-16	.091	-.417	.000	Positive, flat distribution. No outliers suggested by boxplot
	Denial	331	5.10 (1.99)	4-16	1.418	3.358	.000	Positive, peaked distribution. Boxplot suggests 11 outliers, 3 of which are extreme
	Religious coping	331	4.29 (1.73)	4-16	4.173	24.540	.000	Positive, peaked distribution. Boxplot suggests lots of outliers, 13 extreme
	Humour	331	9.21 (3.91)	4-16	.124	1.546	.000	Positive, peaked distribution. No outliers suggested by boxplot
	Behavioural disengagement	331	5.40 (2.17)	4-16	1.154	1.546	.000	Positive, peaked distribution. Boxplot

153

Restraint	331	7.71 (3.13)	4-16	.367	.039	.000	Positive, peaked distribution. No outliers suggested by boxplot
Use of emotional social support	331	7.19 (3.44)	4-16	.884	.300	.000	Positive, peaked distribution. No outliers suggested by boxplot
Substance use	331	6.27 (3.69)	4-16	1.394	1.014	.000	Positive, peaked distribution. Boxplot suggests 8 outliers
Acceptance	331	11.34 (3.36)	4-16	-.763	.567	.000	Negative, peaked distribution. Boxplot suggests 2 outlier
Suppression of competing activities	331	7.12 (2.78)	4-16	.392	-.037	.000	Positive, flat distribution. Boxplot suggests 1 outlier
Planning	331	8.37 (3.63)	4-16	.329	-.550	.000	Positive, flat distribution. No outliers suggested by boxplot

The means and standard deviations for all the measures used were compared to studies in which the measures were originally developed and where appropriate subsequently used in firefighter samples to test whether the scores in this study were commensurate with prior research.

Personality

The Revised NEO Personality Inventory (Costa & McCrae, 1992) measures personality in terms of five basic dimensions, Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness.

The International Personality Pool (Goldberg, 1999), from which the measure of personality was constructed, does not offer normative data and guards against using it because it is not obvious that one could ever find a population of which one's current sample is a representative subset (http://ipip.ori.org/).

Research question B3 sought to investigate whether there is a research personality in line with Mitchell and Bray (1990) suggestion that emergency services personnel share a number of characteristics and are action orientated, inner directed, easily bored, traditionally socially conservative, highly dedicated and obsessed with high standards of performance. In short, they have "very different personalities from the average person" (Mitchell & Bray, 1990, p.19). This idea has been contested in the literature and subsequent research has found no evidence for the existence of this research personality (Wagner et al, 2009; Salters-Pedneault et al, 2010). Literature has however, consistently suggested the

existence of higher levels of extraversion in emergency services personnel (Hui et al, 2001; Wagner et al, 2009). Thus, it might be expected that participants in the current study would score highest on the domain of extraversion. Contrary to this prediction, however, as can be seen from Table 7.5.1 participants in the current study scored highest on conscientiousness and lowest on neuroticism with extraversion only scoring higher than neuroticism. Nevertheless, this does accord with the findings of Klee and Renner (2013) who investigated personality variables in a sample of German emergency service workers and also found the highest scores in the domain of conscientiousness and the lowest scores in the domain of neuroticism. They argue that the lower scores on neuroticism are understandable given that emotional stability is a prerequisite for emergency services personnel who are faced with life-threatening events and increased conscientiousness fits with the fact that the work that they do is responsible and challenging with any small errors potentially leading to death (Klee & Renner, 2013).

Optimism

The overall mean for the participants in the current study was 13.97 (standard deviation 5.32) but the study in which the measure was developed (Scheier et al, 1994) computed the means and standard deviations separately for each sex and therefore these are also detailed in Table 7.5.2. The measure was developed in the US with the use of two independent samples, undergraduates and patients awaiting coronary artery bypass surgery (Scheier et al, 1994). Higher scores represent greater optimism.

Table 7.5.2

Means and Standard Deviations for the Revised Life Orientation Test

	Current Study		Scheier et al. (1994)				Landen and Wang (2010)
	Men	Women	Men (college students)	Women (college students)	Men (Bypass patients)	Women (Bypass Patients)	Fire-fighters
Mean	13.93	14.38	14.28	14.42	15.24	14.92	16.23
Standard Deviation	5.23	6.42	4.33	4.12	4.09	3.97	3.74

As can be seen from Table 7.5.2 the means for the sample were similar to the study in which the measure was developed (Scheier et al, (1994) but the standard deviations were slightly higher particularly for the women suggesting more variability in the scores for the women in this study.

Landen and Wang (2010) measured optimism using the LOT-R (Scheier et al, 1994) in a large sample of US firefighters and the mean and standard deviation for this study are also shown in Table 7.5.2.

Resilience

The study in which the measure was developed (Connor & Davidson, 2003) evaluated mean resilience scores in different study groups, taken from the general population, primary care outpatients, psychiatric outpatients in private practice, individuals in a study of generalized anxiety disorder and subjects in two clinical trials of PTSD. Higher scores indicate increased psychological resilience.

Table 7.5.3

Means and Standard Deviations for the Connor-Davidson Resilience Scale

	Current Study	Connor and Davidson (2003)						Lee et al. (2014)
		General population	Primary care	Psychiatric outpatients	GAD patients	PTSD patients	PTSD patients	Fire-fighters
Mean	69.93	80.40	71.80	68.00	62.40	47.80	52.80	64.52
Standard Deviation	13.98	12.80	18.40	15.30	10.70	19.50	20.40	17.08

As can be seen from Table 7.5.3 the means in this study are much lower than the general population group and are more in line with the primary care or psychiatric outpatients study groups. However, as the data reported in the research by Connor and Davidson (2003) was collected in the US these differences could be reflecting cultural differences that exist between the US and UK.

However, more recent research undertaken by Lee et al, (2014), used the Connor-Davidson Resilience Scale (Connor & Davidson, 2003) in a large sample of firefighters. Although firefighters in the Lee et al. (2014) study were Korean as can be seen from Table 7.5.3, whilst standard deviation is higher, the mean resilience score is much close to that reported in the current study.

Well-being

The Ryff Scales of Psychological Well-Being (Ryff, 1989) is a multidimensional measure of well-being consisting of six subscales and was developed within the US using a sample of adults (young, middle-aged and older adults) recruited through educational institutions and community and civic organizations. Whilst higher scores indicate higher self-ratings on the assessed dimension Ryff (1989), suggested that there is no specific cut off points for defining high or low well-being but instead those distinctions are best derived from distributional information from the data collected using the 25% and 75% quartiles. Table 7.5.4 details the means, standard deviation and distribution of scores on each of the subscales.

Table 7.5.4

Means, Standard Deviations and Percentiles for the Ryff Scales of Psychological Well-Being

	Mean	Standard Deviation	Percentiles 25	50	75
Autonomy	39.79	7.45	35	40	45
Environmental Mastery	39.21	8.85	33	41	45
Personal Growth	40.61	8.17	35	41	47
Positive relations With others	37.37	9.69	30	37	45
Purpose in life	38.45	8.50	33	39	45
Self-Acceptance	37.84	10.18	30	40	46

The distributional information of the data displayed in Table 7.5.4 suggests that the distribution of scores within the current study are very similar across all the six scales of well-being and that this population were high in well-being as the 25% percentiles have scores, which are very close to the mid-point of the scale (that being 31.50). With the exception of the domains of positive relations with others and self-acceptance (where the scores are only slightly lower) 75% of the sample reported scores above the mid-point of the scale. Ryff (1989) definitions of high and low scores on each of the six sub-scales are as follows:

Autonomy – According to Ryff (1989) high scorers on this dimension are self-determining and independent; able to resist social pressures to think and act in certain ways; regulates behaviour from within and evaluates self by personal standards. Low scorers are concerned about the expectations and evaluations of others; relies on judgement of others to make important decisions and conforms to social pressures to think and act in certain ways.

Environmental Mastery – According to Ryff (1989) high scorers on this dimension have a sense of mastery and competence in managing the environment; controls complex array of external activities; makes effective use of surrounding opportunities and are able to choose or create contexts suitable to their personal needs and values. Low scorers have difficulty managing everyday affairs; feel unable to change or improve surrounding context; are unaware of surrounding opportunities and lack a sense of control over external world.

Personal Growth – According to Ryff (1989) high scorers on this dimension have a feeling of continued development; see themselves as growing and expanding; are open to new experiences; have a sense of realising their own potential; able to see improvement in themselves and their behaviour over time and change in ways that reflect more self-knowledge and effectiveness. Low scorers have a sense of personal stagnation; lack a sense of improvement or expansion over time; feel bored and uninterested in life and feel unable to develop new attitudes or behaviours.

Positive Relations With Others – According to Ryff (1989) high scorers on this dimension have warm and satisfying relationships with others; are concerned about the welfare of others; are capable of strong empathy, affection and intimacy and understand give and take in human relationships. Low scorers have few close, trusting relationships with others; find it difficult to be warm, open and concerned about others; are isolated and frustrated in interpersonal relationships and are not willing to make compromises to sustain important ties with others.

Purpose In Life – according to Ryff (1989) high scorers on this dimension have goals in life and a sense of directedness; feel there is meaning to present and past life; hold beliefs that give life purpose and has aims and objectives for living. Low scorers lack a sense of meaning in life; have few goals or aims; lack a sense of direction; does not see a purpose in life and has no outlook or beliefs that give life meaning.

Self-Acceptance – According to Ryff (1989) high scorers on this dimension possess a positive attitude towards themselves; acknowledges and accepts multiple aspects of the self, including good and bad qualities and feels positive about their past life. Low scorers feel dissatisfied with themselves; are disappointed with what has occurred in the past; are troubled about certain personal qualities and wishes to be different to what they are.

The definition of high scores provided by Ryff (1989) on each of these domains illustrates many of the attributes, which closely align to the prevailing culture of the Fire and Rescue Service, articulated by participants in the qualitative study as one of continuous learning and development. For example, being open to new experiences and seeing oneself as growing and expanding, which are attributes of high scorers on the domain of personal growth, are some of the core values of the Fire and Rescue Service, articulated by participants in study one. High scores on the domain of environmental mastery involve a sense of mastery and competence in managing the environment and this could almost be seen as an essential attribute for working in an emergency rescue role. In recounting incidents, which they had attended, participants in study one often spoke about an environment, which was complex, fast paced and involved an array of different activities. Within the domain of positive relations with others, high scores have warm and satisfying relationships with others (Ryff, 1989). The extant literature has documented strong, trusting relationships with co-workers within this population (Kirschman, 2004), which were also reported throughout participants accounts in study one.

Disruption of Core Beliefs
The overall mean for the participants in the current study was 14.08 (standard deviation 12.08), which is comparable with the means reported for study three in the study in which the measure was developed (Cann et al, 2010).

Table 7.5.5

Means and Standard Deviation for the Core Beliefs Inventory

	Current Study	Study One	Cann et al. (2010)			
			Study Two		Study Three	
			Time 1	Time 2	Time 1	Time 2
Mean	14.08 (12.08)	27.27	25.92	24.30	13.32	14.31

Cann et al. (2010) evaluated the mean scores on the Core Beliefs Inventory in three separate studies, the first two of which used a sample of undergraduate students, at a US university, and the third used a sample of newly diagnosed acute leukemia patients, within the US. Studies two and three also used test and re-test procedures; time two for study two was two months and for study three it was between five and six weeks. However, as can be seen from Table 7.5.5 above the differences in means and standard deviations between times one and two were very small.

Higher scores indicated a greater challenge to participant's core beliefs about the world. As can be seen from Table 7.5.5, although the mean score in the current study is much lower than those reported in studies of undergraduate students, it is comparable with the mean reported in study three of Cann et al. (2010) study. The standard deviation reported in the current study is high, suggesting that there was a great deal of variability in the extent to which participant's core beliefs about the world were challenged.

Posttraumatic Stress
The finding that the overall mean for The Posttraumatic Diagnostic Scale for DSM-5 (Foa et al, 2016) in the current study was 10.48 addresses research question A2, which sought to address the prevalence of posttraumatic stress in this population. However, the measure consists of four subscales (four symptom clusters of the diagnostic criteria for PTSD according to DSM-5) and therefore the means and standard deviations for these are reported in Table 7.5.6.

Table 7.5.6

Means and Standard Deviations for The Posttraumatic Diagnostic Scale for

DSM-5

	Current Study		Foa et al. (2016)	
	Mean	Standard Deviation	Mean	Standard Deviation
Intrusion	2.59	3.13	7.16	4.98
Avoidance	0.95	1.44	3.72	2.49
Changes in cognition and mood	3.06	4.65	10.34	7.63
Arousal and hyperactivity	3.89	4.70	9.60	6.16
Total severity Score	10.48	12.53	30.82	19.03

An initial investigation of Table 7.5.6 shows that the means in the current study are much lower on both the total severity score and each of the four subscales suggesting that the severity of PTSD symptoms within the sample is far lower than the general population sample in the original research. However, the sample used in the scale validation study, was recruited from a number of Southern and Eastern states of the US and included a wide demographic, including college students, veterans, ambulance personnel and individuals receiving treatment at mental health clinics (Foa et al, 2016).

It should be acknowledged that the distribution of scores on this measure were positively skewed, (as can be seen in table 7.5.1) which is often the case when measures used to assess clinical psychological constructs are used in the general population, as most people record relatively few symptoms (Pallant, 2013). Consideration was given to the transformation of variables in order to get the data to fit the assumption of multivariate normality. However, in doing so some of the information regarding the relative distance of scores in the scale to each other would be lost and therefore transformation may actually hinder interpretation (Tabachnick & Fidell, 2014). Additionally with reasonably large samples, skewness will not "make a substantive difference in the analysis" (Tabachnick & Fidell, 2014, p.80) and whilst Kurtosis can result in an under-estimate of the variance the risk of this is also reduced if the sample size is in excess of 200 participants (Tabachnick & Fidell, 2014). Thus, for the reasons outlined transformation was not undertaken.

As the variable was skewed it was also appropriate to further examine the scoring of the measure and the distribution of scores within the current study. Potential scores on the PDS-5 (Foa et al, 2016) range from 0-80, a score of 28 can be used as a cut-off point for a possible diagnosis of PTSD, with scores between 0-27 suggesting no diagnosis and 28-80

suggesting probable diagnosis. In the study in which the measure was developed, 56.8% of the sample were reported to have met the criteria for PTSD diagnosis (Foa et al, 2016). Within the current study 10.6% of the sample scored 28 and above. Thus, a significantly lower number of firefighters met the possible diagnosis for PTSD.

Foa et al. 2016 also provided clinical guidelines for PTSD symptom severity and Table 7.5.7 details the number of participants in each of the categories in the current study.

Table 7.5.7

Clinical Guidelines for PTSD Symptom Severity

Range of Scores	Number of Participants	Percentage of Participants
0-10 Minimal symptoms	211	63.70
11-23 Mild symptoms	72	21.80
24-42 Moderate symptoms	36	18.90
43-59 Severe symptoms	10	3.00
60-80 Very severe symptoms	2	0.60

As can be seen from Table 7.5.7 the majority of participants in the current study fell within the minimal symptom category.

Posttraumatic Growth

The finding that the overall mean for the Posttraumatic Growth Inventory in the current study was 22.94 addresses research question A1, which, asked whether there was posttraumatic growth in this population. However, the original research by Tedeschi and Calhoun (1996) examined the means in terms of the five subscales and also by sex (as they theorised that there are sex differences in the experience of growth). Table 7.5.8 details the means and standard deviations of the sample alongside the original research by Tedeschi and Calhoun (1996). No standard deviations were reported in the original scale validation paper and participants were split into two groups; one group that reported no traumatic events and another group who reported at least one intensely traumatic event in the past year (Tedeschi & Calhoun, 1996). Higher scores can be interpreted as greater posttraumatic growth in each of the domains.

Table 7.5.8

Means and Standard Deviations for The Posttraumatic Growth Inventory

| | Current Study | | (Tedeschi and Calhoun, 1996) | | | | Durkin (2010) Firefighters |
| | | | No trauma Group | | Trauma Group | | |
	Men	Women	Men	Women	Men	Women	-
Relating to others	7.74 (7.95)	7.79 (8.73)	22.16	23.94	23.30	29.68	-
New possibilities	4.39 (5.62)	5.00 (5.66)	15.19	18.26	18.35	20.94	-
Personal strength	5.13 (5.01)	7.10 (5.15)	13.63	14.65	15.30	17.90	-
Spiritual change	0.61 (1.53)	0.72 (1.65)	5.56	6.48	4.96	8.29	-
Appreciation of life	4.88 (4.06)	5.31 (3.9)	9.59	10.16	11.70	13.45	-
Total PTGI	22.75 (21.28)	25.93 (22.91)	66.13	73.49	73.61	90.26	26.08 (20.61)

The means within this study are much lower for both men and women on all of the five domains than either the trauma or no trauma group in the study in which the measure was developed (Tedeschi & Calhoun, 1996) suggesting that they have experienced less growth in all of these domains. On initial inspection it would also appear that women scored higher than men on all domains of growth, thus replicating Tedeschi and Calhoun (1996), findings however, these differences did not reach statistical significance when inferential statistics were performed. The standard deviations on the total scores for both men and women are extremely high suggesting a great deal of variability in participant's reports of growth.

However, there were a number of significant differences between the samples in the current study and the original research conducted by Tedeschi and Calhoun (1996), which may help to account for the differences in scores. Tedeschi and Calhoun (1996) sample consisted of 117 Psychology undergraduates from a large university in the South Eastern United States. Tedeschi and Calhoun (1996) argue that college students were an appropriate sample for the development of the Posttraumatic Growth Inventory, as they are comparable to the general population in terms of their experiences of trauma. However, other researchers have cited the use of student samples as a limitation of their studies, arguing that they may limit the generalisability of results based on factors such as limited range in terms of socioeconomic status and overall life experiences (Lancaster, Klein, Nadia, Szabo, & Mogerman, 2015). Furthermore, Tedeschi and Calhoun (1996) sample consisted of a much higher percentage of women (55 participants were men and 62 were woman) as opposed to the current study in which 297 participants were men and 29 were women. Research suggests sex differences in the degree to which men and women report posttraumatic growth with women reporting higher levels of posttraumatic growth than men (Vishnevsky

et al, 2010). Secondly, ninety-five percent of participants in Tedeschi and Calhoun (1996) study were between the ages of 18 and 28 in contrast to the current study in which the range of ages was between 22 and 58 with a mean age of 43.3. Research has also suggested that more posttraumatic growth is likely to be reported by younger people (Tedeschi & Calhoun, 2004).

Additionally these differences in scores could be a reflection of the cultural differences that exist between the US and the UK. Pals and McAdams (2004) suggested that the very notion of growth encapsulating the idea of getting bigger and stronger over time is a characteristically American perspective on human life. The USA is repeatedly referred to as the land of opportunity, a country where individuals can achieve success even in the face of adversity and consequently this cultural narrative may mean that American participants are particularly receptive to the idea of posttraumatic growth (Pals & McAdams, 2004). A study carried out by Lindstrom et at. (2013), using a sample of American college students, found that 98% of participants reported at least some cultural exposure to themes of growth. Consistently lower rates of posttraumatic growth have been reported in studies outside of the US (Morris et al, 2005; Norlander, Von Schedvin, & Archer, 2005; Zoellner, Rabe, Karl, & Maercker, 2011). For example, the mean posttraumatic growth scores reported were 51.97 in a sample of Australian undergraduate students (Morris et al, 2005); 34.22 in a sample of Swedish Police (Norlander, Schedvin, & Archer, 2005); 39.10 in a sample of German survivors of motor vehicle accidents (Zoellner et al, 2011). In line with the current study these studies also reported large standard deviations, 21.40, 25.29 and 18.68 respectively (Morris et al, 2005; Norlander et al, 2005; Zoellner et al, 2011). This may indicate that the experience of posttraumatic growth is idiosyncratic in nature across cultures and types of trauma encountered.

A more parsimonious explanation of the low scores is that firefighters in the current study were not actually fully engaging in the processes that are related to core mechanisms proposed to be operating in the experience of posttraumatic growth. For example, an individual's social system and self-disclosure about one's reactions to the traumatic event are theorised to play an important part in the process of growth as they facilitate cognitive processing (Tedeschi & Calhoun, 2004). Whilst participants in study one articulated the use of talking to colleagues as a way of dealing with traumatic incidents what was actually talked about was never explicitly articulated and therefore the extent to which self-disclosure took place is unclear. An unwillingness to talk about distress or mental health symptoms has been typically observed in high risk and male dominant populations (Skeffington, Rees, Mazzucchelli, & Kane, 2016). Previous research has also suggested that first responders are less likely to disclose emotions relating to potentially traumatic incidents than members of the general population are to engage in general emotional disclosure (Hoyt et al, 2010).

Table 7.5.8 also details the means and standard deviation reported in a study exploring posttraumatic growth in a sample of, predominantly male, UK firefighters. The mean reported by Durkin (2010) is much more comparable to that reported in the current study and once again there is a very large standard deviation. Other research investigating the prevalence of posttraumatic growth in emergency services workers has also reported significantly lower means than those reported by Tedeschi and Calhoun (1996) (Shakespeare-Finch et al, 2003; Shakespeare-Finch et al, 2003; Armstrong et al, 2014). Shakespeare-Finch et al. (2003) suggested that these significantly lower rates of posttraumatic growth in emergency service personnel could be reflecting complexities associated with the nature of the traumatic event. For example, Tedeschi and Calhoun (1996) investigated levels of posttraumatic growth in direct trauma survivors whereas the current study focused on posttraumatic growth resulting from work-related traumatic incidents. Armstrong et al. (2014) suggested that emergency service workers are individuals who have self- selected to enter a profession that they know will involve increased exposure to potentially traumatic events and thus traumatic events within this context are considered more distal to them. The training that firefighters go through could serve to prepare them for consequent repeated exposure to events, which lay persons may consider to be very traumatic, to such an extent that their core beliefs are not shattered in the same way by these work related incidents (Armstrong et al, 2014). Thus, without this shattering of core beliefs there is no catalyst to begin the process of posttraumatic growth (Ibid). However, whilst this explanation appears theoretically plausible it is likely that if this was the case the mean score on the Core Beliefs Inventory (Cann et al, 2010), reported in table 7.5.5 would be lower. Neither does this explanation fit with the data obtained in study one in which participants articulated that as good as the training was nothing could actually psychological prepare them for what they would have to deal with as an operational firefighter. These findings were further supported by study two in which the correlation that was performed between training/work preparedness and posttraumatic growth did not reach statistical significance.

The mean for spiritual change is strikingly low in the current study and reflects the findings of the qualitative study (detailed in chapter five). Once again, this may suggest that firefighters in the UK did not endorse spiritual or religious change as a valid domain of growth (see 5.10) and it has been suggested that perhaps spiritual change reflects an individual sense of values, more so than the other areas of growth (Sheikh & Marotta, 2005). Low rates of growth in the domain of spiritual change were also found in previous research using a sample of paramedics (Oginska-Bulik & Kobylarczyk, 2015). However, once again this could be due to cultural differences and it has been argued that this domain of growth reflects the importance of religion and personal spirituality inherent in contemporary American society (Pals & McAdams, 2004). Religious and spiritual development is unlikely to be such a strong growth theme in the life narratives of individuals in cultures where this is not the case (Ibid) and Znoj (2005) argues that European

populations are unlikely to endorse spirituality items and do not view religiosity as a form of strength. Again studies conducted outside of the US have consistently found the least amount of growth in the domain of spiritual change (Shakespeare-Finch et al, 2003; Pollard & Kennedy, 2007; Oginska-Bulik & Kobylarczyk, 2015).

Coping

The COPE Inventory (Carver et al, 1989) consists of 15 subscales measuring coping. Table 7.5.9 below details the means and standard deviations of the sample in the current study alongside the study in which the measure was developed (Carver et al, 1989). The study in which the measure was developed used samples of undergraduate students within a US university (Carver et al, 1989). As the sub-scale Humour was only added to the COPE (Carver et al, 1989) after its initial publication the mean and standard deviation for humour reported in Table 7.5.9 is taken from a study by Khan (2013) who investigated coping in a sample of undergraduate students in North Western United States.

Table 7.5.9

Means and Standard Deviations for the COPE Inventory

	Current Study		Carver et al. (1989)	
	Mean	Standard Deviation	Mean	Standard Deviation
Active Coping	8.41	3.30	11.89	2.26
Planning	8.37	3.60	12.58	2.66
Suppression of competing activities	7.12	2.78	9.92	2.42
Restraint	7.71	3.13	10.28	2.53
Use of instrumental Social support	7.30	3.17	11.50	2.88
Use of emotional Social support	7.19	3.44	11.01	3.46
Positive reinterpretation and growth	9.61	3.14	12.40	2.42
Acceptance	11.34	3.36	11.84	2.56
Religious coping	4.29	1.73	8.82	4.10
Focus on and venting Of emotions	6.61	2.93	10.17	3.08
Denial	5.10	1.99	6.07	2.37
Behavioural disengagement	5.40	2.17	6.11	2.07
Mental disengagement	7.42	2.7	9.66	2.46
Substance use	6.27	3.69	1.38	0.75
Humour	9.21	3.91	*2.41	*0.77

From inspection of the means the most widely used coping strategy in the current study was acceptance, followed by positive reinterpretation and growth and then humour whereas in the original research by Carver et al. (1989) planning was the most widely used coping strategy. This likely reflects differences in the populations and perhaps also the nature of the traumatic events being encountered. The nature of the traumatic incidents experienced by participants in the current study was relatively similar, the most commonly chosen index event being accident. Such incidents fall within the scope of the expected role for

emergency services personnel whereas it is likely that undergraduate students would face different and perhaps a wider range of stressors.

Acceptance is theorised to be particularly important in circumstances where the stressor is something that must be accommodated as opposed to something that can easily be changed (Carver et al, 1989) and incidents attended by firefighters, such as road traffic accidents or fires are generally those which cannot be changed. Participants in study one articulated the importance of acceptance as a means of protecting their own well-being and it is possible that firefighters who are not able to utilise this strategy successfully leave the service. Positive reinterpretation and growth is thought to be a way of managing distressing emotions as opposed to dealing with the stressor per se (Carver et al, 1989) and the idea of using the negative incidents that they attended in a constructive way to aid their own development pervaded all of the participants accounts in study one. The use of humour and particularly black humour was also well documented in study one and replicates findings in the extant literature, which identifies the use of black humour as one of the most familiar coping strategies used in the emergency services (Rowe & Regehr, 2010).

However, the results of the current study do replicate those found by Carver et al. (1989) in that participants reported using coping strategies which, Carver et al. (1989) refer to as adaptive (active coping and planning), to a greater degree than they reported using strategies that theoretically may become less adaptive over time (eg. behavioural and mental disengagement). The mean for substance abuse was much higher in the current study than the study in which the measure was developed (Carver et al, 1989) but did fit with comments made by participants in study one who articulated that drinking alcohol was frequently used as a way of coping with dealing with traumatic incidents. Religious coping was much lower in the current study than the original research (Carver et al, 1989) and again this accords with comments made by some of the participants from study one, who found it difficult to relate to religion given the traumatic incidents that they had to deal with.

It should also be acknowledged that religious coping had a very high positive kurtosis value (see table 7.5.1). Whilst there were a small percentage of participants who endorsed this as a means of coping with difficult events the majority of participants did not. Items measuring religious coping on the COPE (Carver et al, 1989) included "I put my trust in God" and "I try to find comfort in my religion". Participants in study one questioned the existence of God on the grounds of frequently witnessing what they described as bad things happening to innocent people. Thus, it may be that witnessing, what participants in study one described as unexplained loss of life as part of their daily working lives made it very difficult for firefighters to continue to have faith in religious beliefs.

Research questions

All statistical analysis was undertaken using two-tailed tests.

A3. Can posttraumatic growth exist in the absence of posttraumatic stress?

Posttraumatic Stress had a significant but weak relationship with Posttraumatic growth (r=.173, n = 331, p = .002), meaning that participants who had more posttraumatic stress experienced more posttraumatic growth.

In addition to this a new variable was created which grouped participants according to whether they had any symptoms of posttraumatic stress (participants who had scores of 0 on the PDS-5(Foa et al, 2016) constituted one group and participants scoring one or above were in the second group). A score of 0 on the PDS-5 (Foa et al, 2016) indicates that a respondent has no posttraumatic stress symptoms whereas a score of one indicates that a respondent has some symptoms of posttraumatic stress, a sore of 28-80 suggests a probably diagnosis of PTSD. An independent samples t-test comparing the posttraumatic growth scores of participants who did not report symptoms of posttraumatic stress (M = 11.26, SD = 18.06) and participants who did (M = 26.01, SD = 21.21) was significant (t(329) = -5.81, p = .001, equal variance not assumed as Leven's test indicated homogeneity of variance was violated).

Although participants who experienced posttraumatic stress experienced more posttraumatic growth participants with no symptoms of posttraumatic stress (of which there were 70) did still show posttraumatic growth. As the PDS-5 (Foa et al, 2016) asks participants to rate their posttraumatic stress symptoms in the last month it is possible that participants who exhibited no symptoms had experienced posttraumatic stress following a traumatic event but had resolved them by the time they took part in the research. However, a correlation was also performed to assess the relationship between time since the traumatic event and posttraumatic stress. Time since the traumatic event had a significant but weak positive relationship with posttraumatic stress (r=.120, n = 284, p = .043), meaning that far from posttraumatic stress symptoms declining over time since the traumatic incident, they tend to increase. Anecdotal evidence from participant's accounts in the qualitative study suggested that the symptoms of posttraumatic stress were enduring, in some cases over many years. Thus, although it is possible that those showing posttraumatic growth but no posttraumatic stress may have previously resolved this stress, this seems unlikely. As such, it appears that it may be possible for posttraumatic growth to exist without posttraumatic stress. Moreover, it certainly seems the case, that posttraumatic growth and posttraumatic stress do not have to co-exist at the same time.
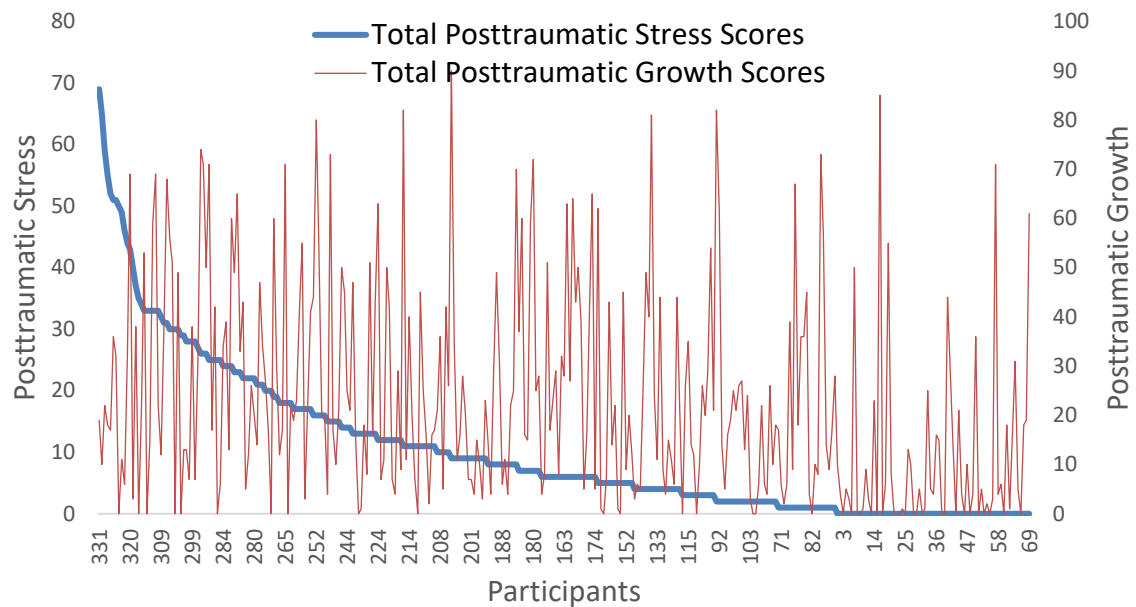
Figure 7.5.1 Relation of posttraumatic growth (total scores on the PTGI) to posttraumatic stress (total scores on the PDS-5).

As can be seen from figure 7.5.1 above posttraumatic growth within this sample is variable at all levels of posttraumatic stress.

A4. Is posttraumatic growth cumulative or related to a specific event?

It is reasonable to assume that generally, increased length of service within the Fire and Rescue Service, equates to increased exposure to traumatic incidents and therefore a correlation was performed to assess the relationship between length of service and posttraumatic growth.

Length of service had a negative and very weak relationship with Posttraumatic growth but this did not reach statistical significance (r = -.047, n = 328, p = .400). Thus, if length of service was not a factor in determining the amount of posttraumatic growth experienced by firefighters it may be theoretically plausible, to suggest that cumulative exposure to trauma does not lead to increases in posttraumatic growth. However, longitudinal research would need to be undertaken to explore this further.

A5. Are there sex differences in posttraumatic growth in this population?

An independent samples t-test was conducted to compare the posttraumatic growth scores for males and females. There were no significant differences in scores for males (M = 22.75, SD = 21.28) and females (M = 25.93, SD = 22.91; t(324) = -.762, p = .446)

In addition to comparing the total posttraumatic growth scores further t-tests were undertaken on the five domains of growth to see if these results would replicate. There were no significant differences in scores for males and females across four of the domains of

169

growth; relating to others, new possibilities, spiritual change or appreciation of life. However, there was a significant difference in the personal strength scores for males (M = 5.13, SD = 5.01) and females (M = 7.10, SD = 5.15; $t(324)$ = -2.02, p = .045).

Again, this finding contradicts Tedeschi and Calhoun's (1996) research that found females scored higher than males on all five domains of growth, which they suggested meant that females and males differ in their responses to trauma. These sex differences had also been previously replicated using operational ambulance personnel (Shakespeare-Finch et al, 2005). However, it may be that as participants in this study come from a very homogenous population they do not actually differ in their responses to trauma. Additionally, because the Fire and Rescue Service is still predominantly male females that join the service may be those who have traits that are more masculine or females within the service are striving to be more masculine. However, the relatively small sample size of 29 females in comparison to 297 males should be noted.

B1. Can we disaggregate between what is naturally occurring growth over a life span and posttraumatic growth?

Age had a negative and very weak relationship with Posttraumatic growth but this did not reach statistical significance (r = -.025, n = 328, p = .651). Therefore, there is no evidence to suggest a relationship between age and posttraumatic growth.

Thus, there was no evidence to suggest that posttraumatic growth increased with age which, would be expected, if participants were reporting naturally occurring growth (as opposed to posttraumatic growth). Therefore, it is theoretically plausible to suggest that the growth that was being reported was not just naturally occurring growth. However, longitudinal research is required to investigate this further.

The finding that age had no impact on levels of growth was discordant with Tedeschi and Calhoun's (2004) position, which was that younger people would be expected to report more growth, than older individuals as they may be open to the learning and change involved in this process to a greater degree than older people who may already have learned their life lessons. This position was further supported by Powell et al. (2003) who using a sample of former refugees with a large age range found that younger people reported considerably more growth than older people.

B3. Which personality factors are associated with posttraumatic growth?

A standard multiple regression was carried out in order to assess the relations between the five factors of personality and posttraumatic growth. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. Sample size can be an issue with multiple regression, with differing guidelines being offered for the recommended number of participants. For example, Stevens (1996) recommends 15 participants per predictor are required for a reliable

equation whereas Tabachnick and Fiddell (2014) suggest using the formula N > 50+8m (m= number of independent variables) to calculate sample size requirements. However, a sample size of 331 is more than adequate whichever method is used.

The overall model was significant, explaining 4.4% of the variance in posttraumatic growth, (F(5,325) = 2.96, p = .013). Table 7.5.10 displays the coefficients, betas and significance for all personality variables in this regression.

Table 7.5.10

Coefficients for the Regression Analysis using Personality Variables to Predict Variance in Posttraumatic Growth

Model Variables	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(constant)	-15.039	11.388		-1.321	.188
Neuroticism	.335	.156	.127	2.141	.033
Extraversion	.476	.188	.160	2.509	.013
Openness to experience	.216	.202	.063	1.073	.284
Agreeableness	.126	.230	.035	.547	.585
Conscientiousness	.056	.195	.018	.285	.776

The significant and positive predictors in the model were extraversion, explaining 1.85% of unique variance, and neuroticism, explaining 1.35% of unique variance. Openness to experience, agreeableness and conscientiousness were not significant predictors in this model.

It is not surprising that extraversion was the strongest predictor of growth as this is concordant with Tedeschi and Calhoun's (1996) model of growth in which extraversion was the personality trait most associated with growth in the general population. Literature has suggested the presence of higher levels of extraversion in firefighters (Wagner et al, 2009) and furthermore, research carried out by Shakespeare-Finch et al. (2005), using a sample of emergency services workers, found extraversion was the personality dimension that correlated most strongly with posttraumatic growth.

The fact that neuroticism was a statistically significant predictor of growth is however, surprising, as this is discordant with all of the current research to date. According to Tedeschi and Calhoun (1996) neuroticism was negatively correlated with growth and although there is an absence of consistent findings in the area there is no research that suggests a positive association between neuroticism and growth. According to a meta-analysis by Linley and Joseph (2004), neuroticism has a negative association with growth

whereas a meta-analysis by Helgeson et al. (2006) concluded that neuroticism was unrelated to growth. Similar findings were also replicated in a sample of emergency services workers, which found that neuroticism was not significantly correlated with posttraumatic growth (Shakespeare-Finch et al, 2005). This is a difficult finding to explain, however, previous research carried out with a sample of military rescuers found higher levels of neuroticism were related to higher levels of posttraumatic symptoms (Hui et al, 2001). These findings were subsequently replicated in a study by Wagner, McFee, and Martin (2010) using a sample of firefighters, reported that neuroticism was a significant predictor of posttraumatic stress and according to current models of growth posttraumatic stress is the catalyst for posttraumatic growth (Joseph, 2012).

Optimism is also considered a personality characteristic that is related to the tendency to perceive positive changes from trauma (Tedeschi & Calhoun. 1996) and therefore, a correlation was performed to assess the relationship between optimism and posttraumatic growth. Optimism had a negative and very weak relationship with Posttraumatic growth but this did not reach statistical significance ($r = -.025$, n = 331, $p = .648$). Therefore, there is no evidence to suggest a relationship between optimism and posttraumatic growth. As such, this contradicts Tedeschi and Calhoun's (1996) finding that suggest a positive association between optimism and posttraumatic growth.

B5. What is the effect of time since the traumatic event on the development of posttraumatic growth?

There was a small positive correlation between time since the traumatic event and posttraumatic growth ($r = .167$, n = 331, $p = .005$), which means that the greater the length of time since the traumatic event occurred the more growth that participants have experienced.

Findings in the literature to date have been inconsistent in relation to the effect that time since the traumatic event has on the experience of posttraumatic growth. Some studies have reported that the longer time that has elapsed since the traumatic event the more posttraumatic growth participants experienced (Polatinsky & Esprey, 2000) whilst others found no association between overall levels of posttraumatic growth and time since the traumatic event (Morris et al, 2005). However, the findings of this study appear to support the idea that posttraumatic growth is a process that gradually unfolds over time as individuals accommodate the new trauma related information (Joseph & Linley, 2005).

C1. What is the relationship between core beliefs and posttraumatic growth?

The Disruption of core beliefs had a strong positive correlation with posttraumatic growth ($r = .573$, n = 331, $p = .01$) which means that that the greater the disruption to participant's core beliefs (caused by the traumatic event) the greater were participants reported growth. As disruption of core beliefs has been reported to be the main predictor of posttraumatic

172

growth (Lindstrom et al, 2013) additional correlations were performed to ascertain whether this result would hold across all five factors of growth. These results are presented in Table 7.5.11.

Table 7.5.11

Table of Pearson-product-moment Correlations Between Disruption of Core Beliefs and the five Subscales of the Posttraumatic Growth Inventory

	Disruption of core beliefs
	-
Relating to others	.510 **
New possibilities	.556 **
Personal strength	.439 **
Spiritual change	.328 **
Appreciation of life	.578 **

** *p* < .001

This replicates the results of the original scale validation research which, reported very similar correlations between scores on the Core Beliefs Inventory and both the total posttraumatic growth scores and each of the five separate domains of growth. (Cann et al, 2010).

C2. What is the relationship between the extent to which firefighters feel that their training prepares them for the job and posttraumatic growth?

There was a medium negative correlation between training/work preparedness and posttraumatic growth but this did not reach statistical significance (r = -.034, n = 329, *p* = .536). Therefore, there is no evidence to suggest a relationship between Training/work preparedness and posttraumatic growth.

C3. What is the relationship between resilience and posttraumatic growth?

Resilience had a positive but weak relationship with Posttraumatic growth (r=.110, n= 331, *p* = .046), meaning that firefighters who were more resilient experienced more posttraumatic growth. It is perhaps not surprising that there was a positive relationship between resilience and posttraumatic growth as they are both salutogenic constructs and psychologically closely aligned. However, Tedeschi and Calhoun (2004) suggest that resilient individuals are likely to report relatively little posttraumatic growth.

C4. What is the relationship between coping strategies and posttraumatic growth?

A standard multiple regression was carried out to assess the relations between the 15 coping strategies (as measured by the COPE; Carver et al, 1989) and posttraumatic growth. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. This revealed that four of the

correlations between the coping sub-scales were above .7 suggesting multicollinearity (Pallant, 2013). Table 7.5.12 outlines the correlations between the 15 coping variables.

Table 7.5.12

Correlations Between Independent Variables of Coping

Independent Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Positive reinterpretation and growth															
2. Mental disengagement	.297														
3. Focus on and Venting of emotions	.170	.356													
4. Use of instrumental social support	.560	.257	.417												
5. Active coping	.677	.311	.257	.654											
6. Denial	.059	.406	.338	.099	.069										
7. Religious coping	.112	.182	.045	.112	.149	.048									
8. Humour	.331	.302	.017	.165	.236	.184	.243								
9. Behavioural disengagement	.080	.471	.430	.181	.103	.602	.055	.204							
10. Restraint	.482	.340	.238	.481	.620	.180	.095	.169	.299						
11. Use of emotional Social support	.440	.233	.484	.718	.466	.106	.130	.172	.142	.319					
12. Substance abuse	-.116	.340	.250	-.044	-.060	.396	.031	.149	.474	.104	.029				
13. Acceptance	.546	.283	.024	.271	.438	.077	.203	.392	.019	.423	.278	.040			
14. Suppression of competing activities	.529	.424	.299	.567	.706	.236	.109	.255	.347	.699	.394	.086	.371		
15. Planning	.627	.286	.223	.608	.813	.069	.185	.174	.121	.636	.423	-.006	.411	.707	

Pallant (2013) suggests that if two variables have a bivariate correlation of .7 or above consideration needs to be given to omitting one of the variables or forming a composite variable from the scores of the two highly correlated variables. Tolerance and Variation inflation factor values were also checked and found to be outside of the recommended range of less than .10 and above 10 respectively (Pallant, 2013). Therefore, the variables planning, suppression of competing activities and the use of instrumental social support were taken out of the regression model. This decision was made by reference to the data from study one, use of emotional social support and active coping were the two variables that were retained, as it was felt that participants in study one articulated these as coping strategies, which they used. Using Tabachnick and Fidell (2013) formula for calculating sample size (discussed under the section research question B3) a sample of 146 participants would be required to conduct the analysis.

The overall model was significant, explaining 28.6% of the variance in posttraumatic growth $F(12,318) = 10.60$, $p = .000$). Table 7.5.13 displays the coefficients, betas and significance for all coping variables in this regression.

Table 7.5.13

Coefficients for the Regression Analysis Using Coping Variables to Predict Variance in Posttraumatic Growth

Model Variables	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(constant)	-14.798	5.094		-2.905	.004
Positive reinterpretation and growth	1.320	.498	.193	2.650	.008
Mental disengagement	1.081	.478	.137	2.261	.024
Focus on and Venting of emotions	1.057	.457	.145	2.314	.021
Active coping	1.228	.490	.189	2.506	.013
Denial	-.146	.658	-.014	-.221	.825
Religious coping	-.762	.619	-.061	-1.232	.219
Humour	-.101	.305	-.018	-.332	.740
Behavioural disengagement	-.202	.688	-.020	-.293	.770
Restraint	-.241	.451	-.035	-.534	.594
Use of emotional Social support	.850	.383	.136	2.220	.027
Substance use	.177	.333	.030	.531	.596
Acceptance	.034	.399	.005	.086	.931

Five of the twelve coping strategies were identified as positive and significant predictors in this model. The significant and positive predictors in this model were positive reinterpretation and growth, explaining 1.59% of unique variance, active coping, explaining 1.42% of unique variance, focus on and venting of emotions, explaining 1.21% of unique variance, mental disengagement, explaining 1.14% of unique variance and use of emotional social support, explaining 1.10% of unique variance.

The finding that positive reinterpretation was the strongest predictor of growth accords with theorists within this area who argue that this is crucial for successful adaptation to

traumatic events and constitutes a pre-requisite for growth to occur (Calhoun & Tedeschi, 1998). This finding also replicates that of a number of meta-analysis, which found a positive association between positive reinterpretation and growth, (Linley & Joseph, 2004: Helgeson et al, 2006; Prati & Pietrantoni, 2009). However, as some researchers have suggested a conceptual overlap between positive reinterpretation and posttraumatic growth (Frazier et al, 2009) a correlation was performed to explore the relationship between these two constructs in the current sample. In line with previous findings of Morris et al. (2007) and Yeung et al. (2016) the correlation in the current sample did not exceed .50, suggesting that these constructs are related but distinct from each other. Yeung et al. (2016) argue that individuals who use more re-appraisal framing tend to see negative events as opportunities to strengthen relationships and learn new things. In doing so they are likely to find meaning in the traumatic event and therefore are more likely to experience posttraumatic growth (Park et al, 2008). There is anecdotal evidence from participant's accounts in study one that attending traumatic incidents was used as a learning experience and often attributed to an increased closeness to colleagues.

The finding that the use of emotional social support is a predictor of posttraumatic growth was again not surprising as emotional social support plays a key role in current models of growth (Tedeschi & Calhoun, 2004). Emotional social support was found to be positively associated with growth in a review carried out by Joseph and Linley (2004) who looked at 39 studies across a variety of populations and types of trauma experienced. Informal debriefing, which tends to take place back at the station following a traumatic event, is one example of emotional social support and gives firefighters the opportunity to talk about their reactions and feelings about the event to fellow watch members, which can help promote cognitive processing of the event (Morris et al, 2007). However, as well as getting moral support and understanding these informal debriefing sessions may also provide an opportunity to freely express any strong emotions that the incident has triggered. This venting may also enable individuals to make meaning of the experience and move beyond distress.

The finding that mental disengagement is a predictor of growth is perhaps somewhat surprising as this strategy is typically viewed as maladaptive and counter- productive to recovery (Kirby et al, 2011). Mental disengagement includes a wide range of activities that act as a distractor in taking the individuals mind off a problem and examples given include daydreaming and escape by immersion in TV (Carver et al, 1989). However, although maladaptive in some circumstances, it has been recognised as a successful approach for firefighters responding to critical incidents (Kirby et al, 2011). In study one this was represented by the category of 'being absent in the moment' (see 5.7) and enabled firefighters to engage with traumatic incidents on a non-emotional level therefore protecting their own well-being. This use of professional detachment has previously been shown to foster positive adaptation to the incident (Zuckerman & Gagne, 2003) and this

finding also lends support to the contextual view of coping that argues different coping strategies are used according to the situation (Schulz & Mohammed, 2004).

C6. What is the relationship between posttraumatic growth and well-being?

A standard multiple regression was carried out in order to assess the relations between the six measure of well-being and posttraumatic growth. Completing preliminary analysis to check violations of normality, linearity, multicollinearity and homoscedasticity revealed that correlations between the independent variables were above .7. Consideration was given to omitting one or more of the variables (Pallant, 2013) however, as the Tolerance and Variance inflation factor values were still well within acceptable levels (less than .10 and above 10 respectively, Pallant (2013), the decision was taken to retain all six independent variables. Sample size was acceptable according to Tabachnick and Fidell (2014).

The overall model was significant, explaining 5.8% of the variance in posttraumatic growth (F(6,324) = 3.35, p = <.003). Table 7.5.14 displays the coefficients, betas and significance for all well-being variables in this regression.

Table 7.5.14

Coefficients for the Regression Analysis using Well-Being Variables to Predict Variance in Posttraumatic Growth.

Model Variables	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(constant)	18.340	7.261		2.526	.012
Autonomy	-.220	.189	-.076	-1.162	.246
Environmental mastery	-.820	.278	-.339	-2.953	.003
Personal growth	.450	.251	.172	1.795	.074
Positive relations With others	.292	.183	.132	1.590	.113
Purpose in life	.201	.271	.080	.741	.459
Self-acceptance	.228	.237	.108	.961	.337

Given that the constructs of psychological well-being and posttraumatic growth are both derived from the eudaimonic tradition (Keynes et al, 2002) relationships might have been expected between posttraumatic growth and all six domains of well-being. However, within this population environmental mastery was the only significant predictor in this model. Environmental mastery was a significant negative predictor, explaining 2.5% of unique

variance. Environmental mastery relates to a sense of mastery and competence in managing the environment (Ryff, 1989). According to Ryff (1989), individuals high on this dimension are able to control a complex array of external activities, make effective use of surrounding opportunities and are able to choose or create contexts suitable for their personal needs. Conversely, individuals low on the domain of environmental mastery have difficulty managing everyday affairs, feel unable to change or improve surrounding contexts, are unaware of surrounding opportunities and lack a sense of control over their external world (Ryff, 1989). Participants in study one suggested that both the initial training they undertake and the prevailing culture of continuous development promotes mastery and competence in managing the environment in which they operate, necessary because the environment in which they operate when responding to incidents is often complex and fast moving. One possible explanation of this relationship could be that the focus that is placed on mastery of their environment and learning from events prevents firefighters from engaging emotionally with the event. Alternatively, it could be that a neuroticism of controlling their environment outside work, displayed by some of the participants in study one leads to decreased well-being.

7.6 General Discussion

Although the rates of posttraumatic growth in the current study may be low in comparison to studies using other populations (Erbes et al, 2005; Kashdan & Kane, 2011; Kamen et al, 2016), 88% of firefighters in this study reported experiencing at least some degree of posttraumatic growth (defined as a score of one or above on the PTGI) following exposure to work related traumatic incidents. This figure is higher than research carried out by Kehl et al. (2014), using a large sample of firefighters from eight European countries (including the UK) reported only 51.7% of participants experienced some degree of posttraumatic growth. Thus, although firefighters are exposed to hazardous and potentially traumatic incidents as part of their daily working lives the finding of the current study reinforced the possibility that positive changes can result from such experiences. In line with the findings from study one the highest levels of posttraumatic growth were reported in the increased appreciation of life domain followed by the domain of personal strength. The lowest levels of posttraumatic growth, in both studies, were experienced in the domain of spiritual change. Calhoun and Tedeschi (2013) assert that the domain of increased appreciation of life is particularly salient to individuals who encounter traumatic events that involve strong reminders of mortality. Within study one there was a general recognition amongst participants that encountering critical incidents, which involved death and destruction, brought with it an increased awareness of the fragility of human life accompanied by an understanding of how swiftly one's life can change. This led participants to recognise their own mortality and thus in turn to appreciate how precious life was, and therefore, it is perhaps not surprising that in this population the highest levels of posttraumatic growth were reported in the increased appreciation of life domain. The low levels of spiritual change that were found may be a reflection of the fact that there are low levels of religious

beliefs within this population. In March 2016 Government statistics on workplace diversity published findings on religion within the Fire and Rescue Service for the first time; 35% of firefighters declared that they had "no religion", which compares to 25% of the general population in England in the 2011 census (Home Office, 2017). However, the report did acknowledge that these figures may not be fully representative of the Fire and Rescue Service as a whole as although the proportion of missing data varied across different Fire and Rescue Services the data did contain a relatively high proportion of "not stated" responses (Home Office, 2016).

The levels of posttraumatic stress symptoms were also low within this study with the majority of participants reporting only minimal symptoms on the Posttraumatic Diagnostic Scale for DSM-5 (Foa et al, 2016) and 10.6% of firefighters at or above the proposed cut off score for a possible diagnosis of PTSD. Although there have been some inconsistencies in prevalence rates of posttraumatic stress disorder in emergency workers some studies have reported a figure of 20% (Heinrichs et al, 2005). However, rates in the current study were in line with those reported by Durkin (2010) who also used a sample of UK firefighters and reported that 11% of participants met the proposed cut off score for a possible diagnosis of PTSD. The possibility that this was a self-selecting sample must be considered, however, as it could have been that firefighters who had suffered more severe traumatic reactions did not participate in order to avoid reminders of the event or did not have the opportunity to participate as they had already left the service.

Although the positive correlation that was found between posttraumatic stress and posttraumatic growth was, weak it does imply the co-existence of both the negative and positive effects of trauma in the sample, which supports Linley and Joseph's (2004) assertion that posttraumatic stress and posttraumatic growth are not separated unrelated phenomenon but rather two aspects of human experience that follows trauma. Symptoms of posttraumatic stress are interpreted within current models of growth as evidence of the emotional processing that is necessary for the emergence of growth (Tedeschi & Calhoun, 2004) and Organismic Valuing Theory states that posttraumatic stress is the catalyst for posttraumatic growth (Joseph, 2012). According to Joseph (2012), an individual experiencing low levels of posttraumatic stress has been minimally affected by a traumatic event and therefore would be expected to experience only minimal posttraumatic growth. Therefore, as firefighters within the study exhibited only low levels of posttraumatic stress it is perhaps not surprising that they displayed only low levels of posttraumatic growth. However, within the current study although higher rates of growth were experienced by those who exhibited symptoms of posttraumatic stress, posttraumatic growth was also experienced by firefighters who had not experienced traumatic reactions. Thus, this finding is seemingly discordant with the dominant models of growth (Tedeschi & Calhoun, 1996; Joseph & Linley, 2006) and the findings of study one, in which all participants reported experiencing posttraumatic growth but also suffering traumatic reactions. One explanation may be that the absence of intrusive thoughts allows the individual to access more preferred coping

strategies (Kirby et al, 2011). However, another explanation may be related to the camaraderie, which is thought to be especially prominent within emergency services cultures and has been shown to be a buffer against the symptoms of posttraumatic stress (Tuckey & Hayward, 2011). It may be that these close co-worker relations also afford opportunities to engage in more reflective rumination, which is focused on making sense of the traumatic incident and has been found to be a predictor of posttraumatic growth (Cann et al, 2011).

Correlations demonstrated that the relationship between posttraumatic growth and many of the other variables in the data set, such as optimism, resilience, age and length of service were very weak. Conversely, however, the relationship between posttraumatic growth and the disruption of core beliefs was a very strong positive one suggesting that this is important in determining posttraumatic growth in this population. Although causality cannot be established this finding does appear to accord with current research suggesting that, the challenge to one's assumptive world is the main predictor of posttraumatic growth (Lindstrom et al, 2013). If the disruption of core beliefs is, the critical factor in initiating the process of posttraumatic growth (Taku & Oshio, 2015) this may also help to explain the finding that length of service was not found to have a significant relationship with posttraumatic growth. Tedeschi and Calhoun (1998) suggest that individuals whose engagement with trauma shatters their assumptive world rebuild and restructure their schemas in ways that will make them more resistant to being shattered in the event of future traumas in much the same way as a community rebuilds its physical structures as stronger and more able to withstand further shocks following an earthquake. There may be a threshold–type effect, which occurs with individuals who experience cumulative exposure to traumatic incidents. it may be that the disruption of core beliefs is something that can only happen to an individual once and therefore even if firefighters experience successive traumatic events there will only be one event that triggers this disruption to the extent that causes significant emotional distress. Thus, cumulative exposure to traumatic events (which it is theoretically plausible to equate with length of service) would not lead to cumulative posttraumatic growth. Speaking to firefighters about traumatic exposure there always appeared to be one incident, which they are immediately able to recall as the one that caused them the most problems. However, whilst using length of service as a proxy for traumatic exposure has been undertaken in previous research (Regehr et al, 2003: Prati et al, 2012) it is possible that this is not appropriate. Therefore, longitudinal research would need to be conducted to explore this further.

Although the finding that age had no effect on posttraumatic growth is discordant with Tedeschi and Calhoun's (2004) position it is perhaps not surprising given the homogeneous nature of the population under investigation. Tedeschi and Calhoun (2004) argue that more growth is likely to be experienced by younger people as they are more open to learning and change. However, these age differences were not replicated in previous research conducted with emergency services personnel (Oginska-Bulik & Kobylarczyk, 2015) and it may be that

in this population individuals share a very similar mindset, which is irrespective of their age. Certainly, participants of various ages in study one articulated this shared mindset. Furthermore, the Fire and Rescue Service as an organisation, promotes the ethos of continuous learning and development and therefore its personnel may be receptive to learning and change irrespective of their age. The lack of sex differences that were found in the total posttraumatic growth scores in this population may also be reflecting this homogeneity, as again what may be important in this population is this shared mindset, which is irrespective of both age and sex.

Although personality factors were found to be a significant predictor of posttraumatic growth, they predicted only a very small amount of the variance, 4.4% whereas coping explained 28.6%, clearly indicating that coping was a much more important factor in the experience of posttraumatic growth. Both emotion focused and problem focused coping strategies were found to be predictors of posttraumatic growth as well as ones traditionally thought of as being maladaptive (Carver et al, 1989). Thus, it appears that particular coping strategies are not always beneficial or problematic across all situations but can be both adaptive and maladaptive according to the situational context (Galvin & Godfrey, 2001). These findings are encouraging, however, as coping strategies are potentially modifiable whereas personality traits are generally thought to be stable and enduring dispositions and as such relatively resistant to change (Sheikh, 2004). Thus, identifying modifiable factors can potentially provide the opportunity for individuals who engage with traumatic events to experience posttraumatic growth as interventions can be designed to promote the specific coping strategies that have been found to be predictors of posttraumatic growth. In the specific context of the Fire and Rescue Service such interventions could be implemented as part of firefighters initial training programmes but also as part of the debriefing that takes place following a traumatic incident.

7.7 Strengths and Limitations of the Study

The study had a number of methodological strengths and limitations. The first strength is the large sample size and the wide geographic distribution of the sample, which included personnel from 22 regional Fire and Rescue Services within the UK. Within the sample, there was also significant diversity in terms of age (ranged between 22 and 58) and length of service (ranged between one year and 34 years). The sample included both male and female firefighters and seven out of the nine roles within the FRS were represented, the only ones that were missing being Assistant Chief Fire Officers and Deputy Chief Fire Officers. There is some evidence that individuals from ethnic minorities are more likely to experience posttraumatic growth (Helgeson et al, 2006) and it was hoped that in targeting some of the larger urban Fire and Rescue Services this relationship could be explored, however, unfortunately there were not enough respondents in these categories to make this possible.

Whilst the study did utilise self-report measures, with the exception of the single item, which was used to assess work preparedness, all the measures chosen were widely

employed and well-validated ones, which helps to increase the rigour of findings. Although measures of growth have been critiqued because they depend on recall (Frazier & Kale, 2006), and may be biased by social desirability of responses (Butler et al, 2005) evidence from other studies suggest that the Posttraumatic Growth Inventory, is not subject to social desirability effects (Tedeschi & Calhoun, 1996) and when used has actually led to underreporting of posttraumatic growth (Smith & Cook, 2004). Furthermore, research has demonstrated that self-reported mental health is a reliable and valid measure (Sawatzky, Ratner, Johnson, Kopec, & Zumbo, 2010). Thus, self- report measures were the most viable and accurate way to measure the constructs in this study and Shakespeare-Finch et al. (2015) argue that anonymity of responses can be assumed to reduce the potential for self-report bias.

Although the choice of variables for study two was driven by the conceptual model developed in study one there were a number of variables that could have been but were not measured such as severity of trauma, which has found to be a predictor of posttraumatic growth in lay populations. Original research by Tedeschi and Calhoun (1996) found that individuals reporting severe trauma reported higher levels of posttraumatic growth than those that did not and subsequent research has found trauma severity to be a significant predictor of posttraumatic growth (Morris et al, 2005). Similarly, within firefighter samples organisational belongingness was found to be significantly related to posttraumatic growth (Armstrong et al, 2014). However, whilst this could be considered a limitation of the research the final online questionnaire consisted of 267 questions and while, as many variables were included, as was felt possible this had to be balanced with considerations of participant fatigue and attrition rates.

The research was cross-sectional and although this has been described as "an ideal method for describing a broad picture, desirable when conducting exploratory research into a specific population" (Shakespeare-Finch et al, 2003, p.61) it does mean that causality cannot be confirmed in the relationships between posttraumatic growth and other variables that were investigated. Further longitudinal research is needed to confirm causality and examine the developmental trajectories of posttraumatic growth within this population.

It is reasonable to suggest that the current sample was essentially representative of the UK Fire and Rescue Service and therefore results are generalizable to this population. However, there are a number of factors, which need to be taken into account when considering the possibility of extrapolating these findings to a wider population. Mitchell and Bray (1990) argue that emergency workers are a self-selected occupational group who may not be representative of the general population in terms of either their personalities or coping strategies. Firefighting has been described as a "very challenging and high risk job" (Malek & Flin, 2010, p.51) and participants have self- selected to enter this profession which invariably increases their exposure to traumatic events. Thus, it is likely that if they experience high levels of distress and feel unable to cope they will leave the organisation,

184

which means that individuals exhibiting high levels of distress or utilising maladaptive coping strategies may not be included in the sample (Kirby et al, 2011). Additionally the close camaraderie experienced in the Fire and Rescue Service, may be unique to emergency service workers (and military populations) and additionally participants have access to a network of support services, which may not be as readily available in the general population. Conversely, though results of the current study did replicate many of the findings of studies using general population samples. In particular the findings in regard to coping are comparable to those found in other populations (Urcuyo et al, 2005; Morris et al, 2007; Pollard & Kennedy, 2007; Yeung et al, 2016), which increases confidence that these coping strategies are key to finding positive benefits in general post-trauma situations (Morris et al, 2007).

7.8 Conclusion to the Chapter

This chapter sought to answer the research questions (see 1:3) by using both descriptive and inferential statistics. The next step was to test the grounded theory model of growth that was developed from the qualitative analysis (detailed in chapter five). In order to do this structural equation modelling was used as this is considered to be a comprehensive approach to modelling data that is "well suited to empirically test richly detailed, process-orientated models of human experience" (Hoyle, 2011, p.2). The next chapter will outline and discuss the results of this modelling.

Chapter Eight: Structural Equation Modelling

8.1 Introduction

In order to test the grounded theory model of posttraumatic growth that was developed in study one, (this was detailed in chapter five, and can be seen in figure 8.1.1) structural equation modelling (SEM) was conducted. SEM has become increasingly popular in psychological research as it has a number of advantages over traditional statistical techniques (Miles & Shevlin, 2001). One of these advantages is that it allows for the examination of the relationships among both measured and latent variables, and in doing so overcomes one of the limitations of path analysis, which can only deal with observed variables (Streiner, 2006). Within the area of trauma almost all of the variables are not directly observable, traumatic reactions and posttraumatic growth for example, are both latent constructs. Arguably, it is not possible to fully capture the complexities of such constructs in single indicators, which would be required if path analysis was to be used (Schreiber, Nora, Stage, Barlow, & King, 2006). Traumatic reactions, for example, cannot be observed directly but are theorised to have four facets of observable behaviours, arousal, changes in cognition and mood, avoidance and intrusion (Foa et al, 2016). SEM is also becoming a popular technique for analysis within emergency services research (Cruddas, 2013) and is increasingly being used for research undertaken within firefighter samples (Regehr, Hemsworth, & Hill, 2001; Brough, 2004; Bernabe & Botia, 2015). It has been argued that this method of analysis is particularly well suited to this area of research as it allows the testing of more theoretically sophisticated models, which are now being developed as a result of advancements in theory (Cruddas, 2013).

Described as a hybrid of factor analysis and path analysis (Weston & Gore, 2006) SEM incorporates the benefits of both multiple regression, in that it simultaneously considers multiple factors that may be influencing a phenomenon, and path analysis, in that it allows for the influence of mediating variables (Cadell, Regehr, & Hemsworth, 2003). However, SEM also has the advantage of dealing with one of the inherent difficulties relating to regression analysis, which is measurement error arising from the multiple interactions (Jaccard & Wan, 1996). SEM allows for the use of multiple measures to represent constructs, therefore addressing the issue of measure specific error (Weston & Gore, 2006). However, although addressing the issue of measurement error is a significant benefit of using SEM (Hoyle, 2011) latent variables are only corrected for sources of error that vary across their indicators (Deshon, 1998). In the current study, all indicators of the latent variables were measured by self-report and therefore, are likely to contain some inherent bias due to self-reporting (Tedeschi & Calhoun, 2004). This bias is shared across all the indicators and, therefore, reflected in the latent variable not removed from it (Hoyle, 2011).

Another difference between SEM and other methods is that in order to ascertain whether the model fits the data multiple fit indices must be interpreted (Webster & Gore, 2006).

Hoyle and Panter (1995) have recommended that researchers report several indices of overall model fit and in line with this, the following five fit indices, (both absolute and comparative fit indices) are reported within this study. The Chi-Square (χ^2), the Root-Mean-Square Error of Approximation (RMSEA; Steiger, 1990), together with the 90% confidence interval, the Comparative Fit Index (CFI; Bentler, 1990), the Tucker Lewis Index (TLI; Tucker & Lewis, 1973) and the Goodness of Fit Index (GFI; Joreskog & Sorbom, 1982).

All analysis was undertaken using Amos v. 23 (Arbuckle, 2014) with maximum likelihood estimation being used in model estimation. Maximum likelihood is the most common estimator although it does assume that variables are continuous (Hoyle, 2011). However, few variables investigated in psychological research are assessed on continuous scales and consequently it has been found to be robust to violations of this assumption providing that measures include five or more response categories (Johnson & Creech, 1983). All measures in the current study used at least five categories.

SEM consists of two stages; firstly, validation of the measurement model, using confirmatory factor analysis (CFA) and secondly, fitting of the structural model (Cadell et al, 2003). Both stages are now reported.

Figure 8.1.1 Grounded Theory Model of Growth
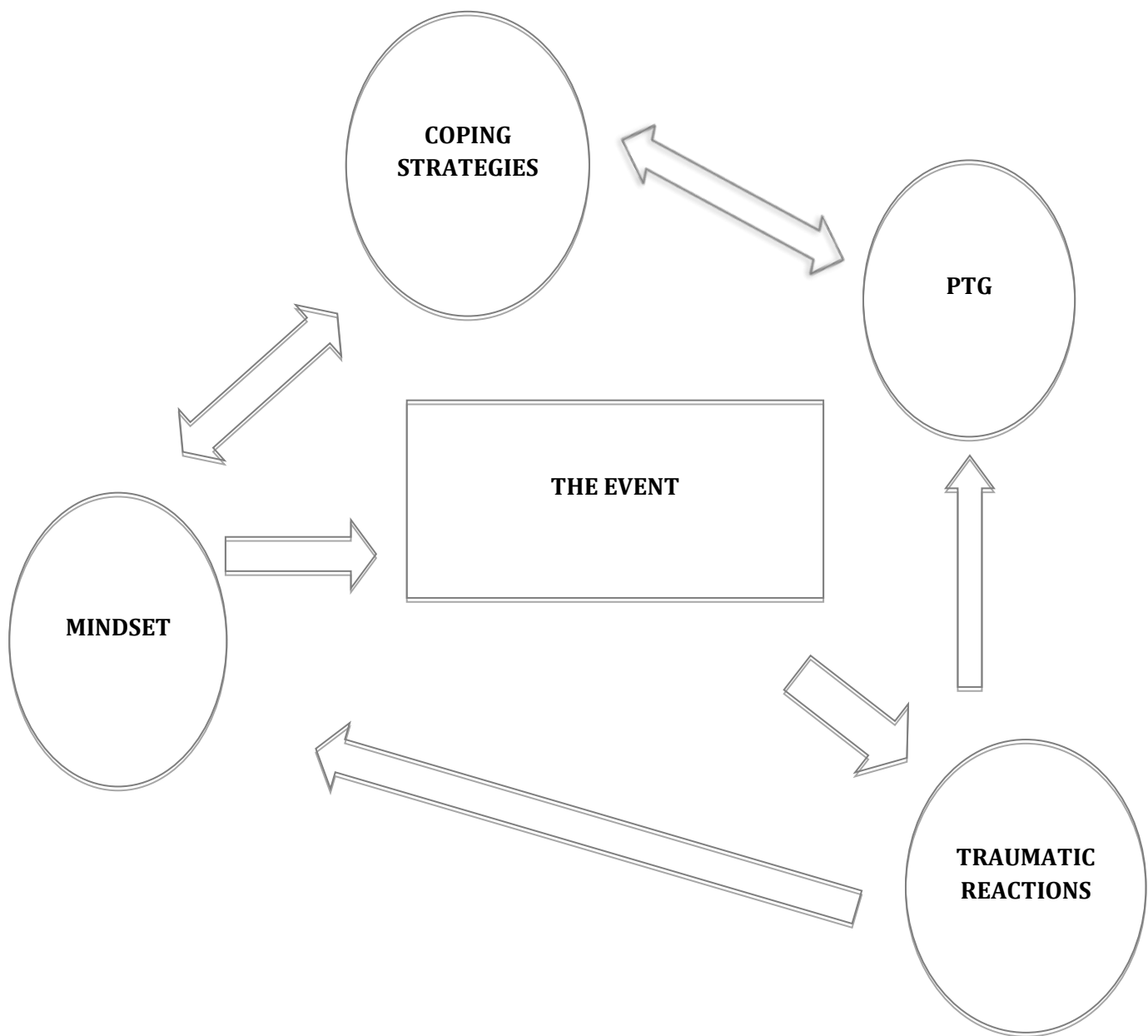
8.2 Design

The Measurement Model

The model that was developed in study one and operationalised in study two, using multiple measures, supported the findings of previous research that the process of posttraumatic growth is a complex one and involves the interplay of many factors (Lindstrom et al, 2013). However, given the large number of variables that were implicated in the process of posttraumatic growth consideration had to be given to the issue of sample size and the viability of testing the original model in respect of the available sample (N= 331).

Whilst no actual consensus exists within the literature as to what sample size is adequate for SEM, previous guidelines issued by Kline (1998) had indicated that 10 to 20 participants per estimated parameter constituted a sufficient sample. More recently, Schreiber et al. (2006) argue that the number is 10 participants per estimated parameter. Other researchers, however, have suggested that the optimal sample size is model specific and depends on a number of factors such as overall model complexity, the desired statistical power and the null hypothesis being tested (MacCallum, Browne, & Sugawara, 1996). Conversely, Jackson (2001, 2003) suggests that the number of indicators per factor and the reliability of observed measures are important determinants of model fit. Weston and Gore (2006) recommend a minimum sample size of 200 whilst Hoyle (2011) suggests that samples do not need to be as large as was originally thought, with 200-400 participants being adequate for most models.

Thus, although the number of participants is significantly larger than Weston and Gore's (2006) recommendation a sample size of 331 was insufficient to test the full model that was developed from the grounded theory. Therefore, a simpler path estimated SEM model had to be implemented, which meant excluding a number of variables that had been identified in study one. As SEM is a theoretically driven technique, (Schreiber et al, 2006) the decision regarding which variables to exclude was primarily made with reference to theory. For example, the exclusion of well-being from the model reflects the fact that it is generally referred to within the literature as an outcome rather than being part of the process of posttraumatic growth (Carver & Antoni, 2004). However, secondary considerations were given to the results of previous statistical analysis (see 7.5) in deciding which variables to exclude. For example, well-being was measured by The Ryff Scales of Psychological Well-being (Ryff, 1989), which has six sub-scales but only , environmental mastery, was found to be a significant predictor of posttraumatic growth when regression analysis was performed (see 7.5).

Four latent variables were constructed prior to model fitting (the process of scale selection and description of the measures chosen was provided in chapter six). The first latent variable, posttraumatic growth was measured using the five subscales of the Posttraumatic Growth Inventory (PTGI: Tedeschi & Calhoun, 1996) as indicators. The second latent variable, traumatic reactions was measured using the four subscales of the Posttraumatic

Diagnostic Scale for the DSM – 5 (PDS-5; Foa et al, 2016) as indicators and was included in the model as theories of growth have suggested that posttraumatic stress is the catalyst for posttraumatic growth (Joseph, 2012).

A third latent variable named mindset was constructed using optimism, resilience, neuroticism and extraversion as indicators. The total scale scores were used for optimism, measured by The Revised Life Orientation Test (Scheier et al, 1994) and resilience, measured by The Connor-Davidson Resilience Scale (Connor & Davidson, 2003) and the total scores of the subscales of neuroticism and extraversion, measured by The 50-item IPIP representation of The NEO-PI-R (Goldberg, 2006). Ideally all the five subscales of personality would have been included but due to concerns about the number of parameters to be estimated relative to participant numbers the decision was taken to exclude conscientiousness, openness to experience and agreeableness. Extraversion was included on the grounds that, it is the personality trait most consistently associated with growth in the general population (Tedeschi & Calhoun, 1996), a relationship that has also been replicated in emergency services workers (Shakespeare-Finch et al, 2005). Neuroticism may appear an unlikely choice for inclusion in the model given that previous research has found it to be either negatively correlated with (Tedeschi & Calhoun, 1996) or unrelated to posttraumatic growth (Shakespeare-Finch et al, 2005). The peripheral category of changing behaviours within the core category of mindset in study one (see 5.4) was thought to reflect the neuroticism facet of personality. As these behaviours represented changes that were attributed to working in the Fire and Rescue Service and exhibited by all the participants to some degree in study one this was thought to be an important facet to include in the model. Furthermore, research by Garnefski, Kraaij, Schroevers, and Somsen (2008) reported that 18% of the variance in posttraumatic growth scores was explained by one's personality using extraversion, neuroticism and conscientiousness as indicators in a SEM model. They claim that these findings are the result of using SEM, which can accommodate high predictor inter-correlations and suggest that, in contrast to what earlier research had suggested all these personality variables are important in the development of posttraumatic growth. Additionally extraversion and neuroticism were the only factors of personality that were found to be significant positive predictors of posttraumatic growth in the regression analysis performed in study two (see 7.5). Training/work preparedness was also excluded from the model on the grounds that, in study one, participants had articulated the view that no amount of training could prepare them for what they would have to deal with as an operational firefighter. This was further supported in study two, in which no significant relationship between this and posttraumatic growth was found when a correlation was performed (see 7.5).

The fourth latent variable was coping. As coping is theorised to be an extremely important component of the process of posttraumatic growth (Tedeschi & Calhoun, 2004) ideally all of the 15 coping subscales of The Cope Inventory (Carver et al, 1989) would have been included in the model. However, given previously discussed constraints regarding

participant numbers a maximum of five coping scales was considered a feasible number to include. Therefore, the fourth latent variable of coping was constructed using the total subscale scores of humour, use of emotional social support, acceptance, mental disengagement and positive reinterpretation and growth as measured by The Cope Inventory (Carver et al, 1989). Some researchers have suggested a conceptual overlap between positive reinterpretation and growth and posttraumatic growth (Frazier et al, 2009). However, in order to check this a correlation was performed between the two constructs and in line with previous research by Morris et al. (2007) and Yeung et al. (2016) this did not exceed .50, suggesting that these constructs are related but distinct from each other. Anecdotal evidence from participant's accounts in study one suggested that these were the five most widely used coping strategies when dealing with work related traumatic incidents (see 5.6). This accorded with previous research carried out with firefighters, which has identified the use of both task-focused and emotion focused coping (Brown et al, 2002) as well as positive re-appraisal (Chang et al, 2003) and black humour (Rowe & Regehr, 2010). Within the wider posttraumatic growth literature, positive re-appraisal and growth and acceptance have consistently been shown to be associated with posttraumatic growth (Calhoun & Tedeschi, 1998; Linley & Joseph, 2004; Yeung et al, 2016). Additionally, acceptance, positive reinterpretation and growth, and humour were the most frequently used coping strategies by firefighters in study two.

Core beliefs was included in the model as previous research has suggested that the challenge to core beliefs is the critical factor in initiating the process of posttraumatic growth (Taku & Oshio, 2015). Core beliefs was measured using the total scale scores of the Core Beliefs Inventory (CBI; Cann et al, 2010) and included as an observed variable as this had only a single indicator. Although some researchers have discouraged testing models that include constructs with single indicators (Bollen, 1989) it is accepted that practical concerns often prevent researchers from using multiple measures (Weston & Gore, 2006). Using multiple measures was not an option in the case of core beliefs as The Core Beliefs Inventory (Cann et al, 2010) was, to our knowledge, the only existing well-validated scale that measures the extent to which an individual's core beliefs are disrupted by traumatic events.

The recommended minimum number of indicators per latent variable in a SEM model is four (Hoyle, 2011) and in line with this recommendation the latent variables used in the current model all had four or more indicators.

As can be seen from figure 8.1.1 posttraumatic growth is a complex and multifaceted construct. An individual's mindset, operationalised in the current model by resilience, optimism, extraversion and neuroticism influences how an individual appraises a traumatic event and therefore the extent to which their core beliefs are disrupted. The measure of the disruption of core beliefs used here refers to a particular trauma that the individual has experienced and thus, an individual's mindset will relate to the way in which their core

beliefs were altered by this event. An individual's mindset will also relate to the way in which they cope with traumatic events, (e.g. using humour, emotional social support, acceptance, mental disengagement and positive reinterpretation and growth). At the same time, mindset is malleable, meaning that the coping strategies an individual uses will also impact on an individual's mindset, (e.g. levels of resilience and optimism) as will the extent to which individuals are displaying ongoing traumatic reactions in response to a traumatic event. The degree to which an individual experiences traumatic reactions in response to a traumatic incident will be influenced by the extent to which an individual's core beliefs are disrupted by the traumatic event. In addition to influencing mindset these ongoing traumatic reactions also relate to posttraumatic growth in that they maybe a prerequisite for growth. The extent to which an individual experiences posttraumatic growth will also impact the way in which an individual copes with traumatic incidents.

8.3 Results and Discussion

Confirmatory Factor Analysis
The first step in the analysis was to perform confirmatory factor analysis on each portion of the measurement model to confirm that the indicators being used loaded onto the latent variables as modelled. All four latent variables were viable and strongly associated (defined as greater than .40 (Amoako-Gyampah & Acquaah, 2008) with their predicted indices and these associations are shown in figure 8.3.1

The Structural Model
The overall fit of the model was satisfactory but not excellent (χ^2 = 476, *df139*, *p* = .00) (RMSEA = .08, 90% CI = .078, .095, CFI = .91, TLI = .89, GFI = .87).

Whilst a significant *p* value indicates that, there was a discrepancy with the data there are two limitations inherent with this statistic (Weston & Gore, 2006). Firstly, this statistic tests whether the model is an exact fit to the data and finding an exact fit is rare (Ibid). Moreover, it has been argued that testing a perfect fit is not appropriate for social sciences because of the complexity of the causal relationships (Cadell et al, 2003). Martens (2005) asserts that the view commonly taken by social scientists is that approximating the observed data is acceptable and can result in important contributions to the literature. Secondly, Chi-squared test is highly dependent on sample size and therefore, Streiner (2006) suggests that whilst these results should be borne in mind researchers, should not be overly influenced by them. The root mean square error of approximation (RMSEA) is a measure of discrepancy per degree of freedom between the model and the population (Regehr et al, 2001) and in developing this Steiger (1990) proposed that values below .05 indicate an excellent fit and values less than .08 indicate a reasonable fit. Thus, the model's value of .08 indicates that the model fits reasonably well (although it is acknowledged that the upper bound of the confidence interval did exceed the generally recommended cut-off). The Comparative fit index (CFI) is an incremental fit index, which compares the structural model to the null

hypothesised model (one which specifies no relationships between variables). CFI ranges from 0 to 1.0 with values closer to 1.0 indicating a better fit (Weston & Gore, 2006). Bentler (1990) suggests values of .90 or greater indicate a reasonable fit and again the model's value of .91 falls within this range. Similarly, the Tucker Lewis Index (TLI) at .89 nears the .90 deemed to indicate a reasonable fit (Bentler, 1990). The Goodness of Fit Index (GFI) evaluates the degree to which the sample covariance matrix could be accounted for by the estimated covariance matrix, values above .90 indicating a good fit (Webster & Deng, 2015). Again, the GFI at .87 nears the .90 deemed to indicate a good fit (Joreskog & Sorbom, 1982).

It is possible that the fit indices could have been improved upon by the addition of further paths however; these would not have been supported by theory. As the purpose of modelling was to test the grounded theory developed from participants accounts in study one, modification indices were not checked and no modification was attempted.

Figure 8.3.1 shows the structural equation model with standardised regression weights for path coefficients. To aid clarity of presentation, the error terms associated with latent variable indicators have been removed. Also for purposes of clarity, only significant direct paths are shown. There were three nonsignificant parameters that were tested but not displayed in figure 8.3.1 traumatic reactions which were not associated with posttraumatic growth ($\beta = .06$, $p = .38$), traumatic reactions which were not associated with coping ($\beta = .12$, $p = .15$) and core beliefs which were not associated with coping ($\beta = .15$, $p = .08$). Bootstrapping was used to explore indirect effects in the model and one significant indirect effect on posttraumatic growth was found, core beliefs mediated the relationship between mindset and posttraumatic growth ($\beta = .32$, $p = .001$).

Figure 8.3.1 Structural equation model with standardised regression weights for path coefficients (*p*<.001).
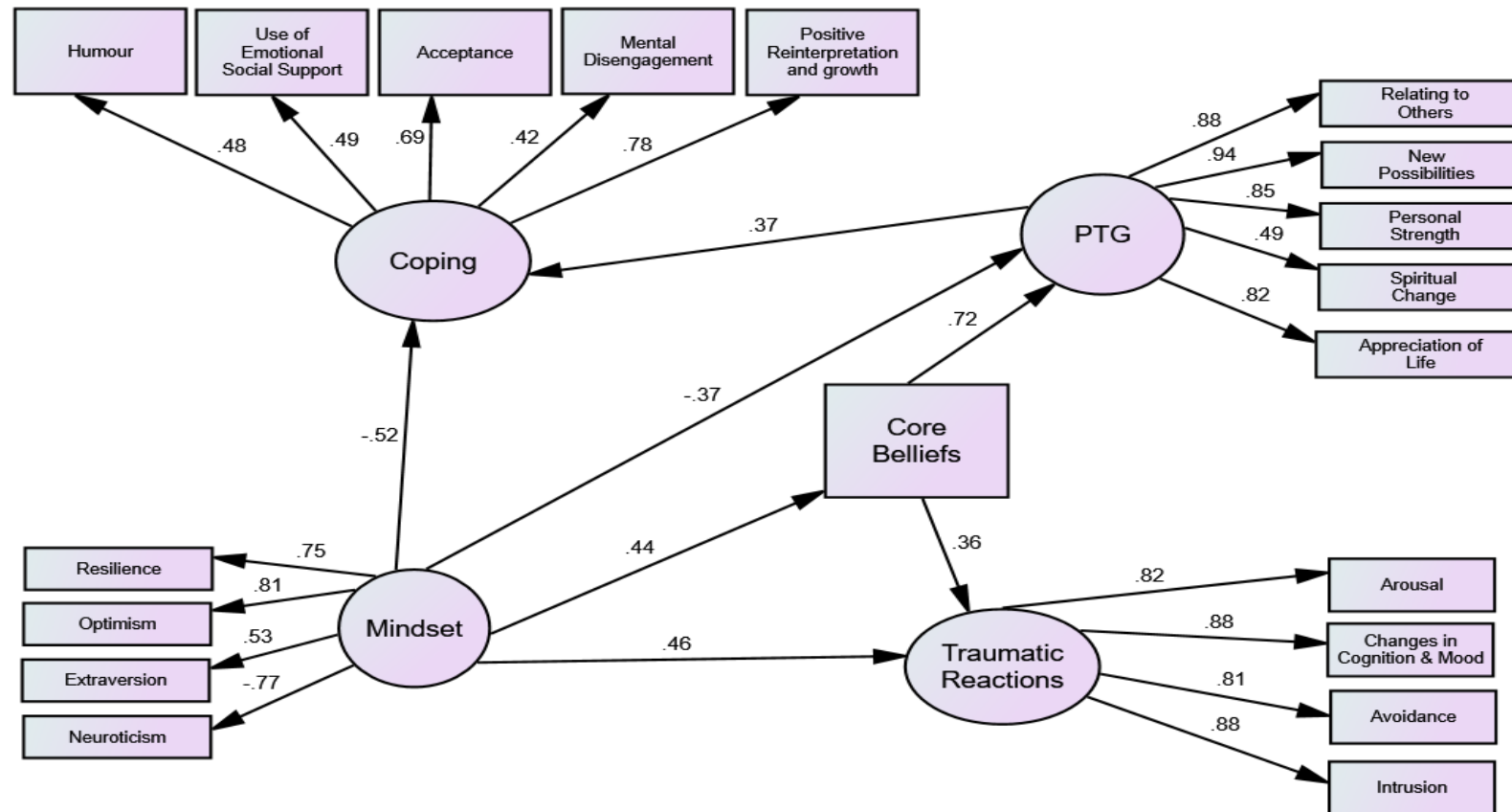
The primary purpose of conducting SEM was to evaluate the grounded theory model of growth developed from study one. Results suggest that the scores on the Posttraumatic Growth Inventory (PTGI: Tedeschi & Calhoun, 1996) were well predicted by the model with 45% of the variance in posttraumatic growth being explained by the relationships in the path model outlined in figure 8.3.1

Perhaps the most noteworthy finding within the current model is that there was no significant path between traumatic reactions and posttraumatic growth. Although a correlation (see 7.5) indicated a positive but weak statistically significant relationship between posttraumatic stress and posttraumatic growth when examined in the context of the current model, which contains multiple factors, no significant path was found. This finding is seemingly discordant with the dominant models of growth, in which traumatic reactions signal that an individual's assumptive world has been challenged (Tedeschi & Calhoun, 1996; Joseph & Linley, 2006). These intrusive and avoidant states which are characteristics of posttraumatic stress disorder (Joseph & Linley, 2005) enable the emotional processing that is necessary to make meaning of the traumatic experience, which ultimately leads to posttraumatic growth (Tedeschi & Calhoun, 2004). Thus, according to the Organismic Valuing Theory of Growth, posttraumatic stress is the catalyst for posttraumatic growth (Joseph, 2012). These findings are also, seemingly discordant with those of study one in which all participants reported experiencing posttraumatic growth but also suffering traumatic reactions, although both the qualitative analysis and quantitative measure revealed significant differences between participants in the amount and severity of symptoms.

It should be acknowledged, however, that traumatic reactions were measured in the current study by the PDS-5 (Foa et al, 2016), which asks participants about the symptoms of posttraumatic stress that they have experienced in the last month. However, the mean length of time since the traumatic event was 7.27 years, meaning that for many of the participants the traumatic incident that they answering in relation to occurred some time ago and therefore it is not known whether they experienced traumatic reactions as a result of this or not. Thus, the lack of a significant path between traumatic reactions and posttraumatic growth indicates that the traumatic reactions being reported now do not relate to posttraumatic growth experienced as a result of the traumatic incident. There are several possible explanations for this. Firstly, some of the firefighters may have undergone significant trauma in a time scale that was not included in the questionnaire, which subsequently led to posttraumatic growth. Secondly, participants who reported currently experiencing traumatic reactions are not currently experiencing posttraumatic growth. However, if posttraumatic growth is a process that gradually unfolds over time as has been suggested (Joseph & Linley, 2005) it is possible that these participants may experience growth in the future. Lastly, it may be simply that posttraumatic stress is not a pre-requisite for posttraumatic growth as has been suggested by current models of growth (Joseph, 2012). However, it should be noted that the level of posttraumatic growth within the

sample was low. Although 88% of participants reported some degree of posttraumatic growth, the overall mean was only 22.94.

Less surprising is the strong, direct and significant relationship that was found between core beliefs and posttraumatic growth as previous research has found that it is this challenge to an individual's assumptive world that provides the departure point for eventual posttraumatic growth (Triplett et al, 2012). "Overwhelming experiences shatter…fundamental assumptions" (Janoff-Bulman, 1992, p.63) forcing individuals to re-examine their beliefs about the world in order to accommodate the new incongruent trauma related information into existing mental models (Joseph & Linley, 2005). It is during this period of re-examination that the opportunity exists for an individual to recognise the positive benefits that can be afforded from the traumatic experience (Cann et al, 2010). Consistent with previous research (Lindstrom et al, 2013) the disruption of core beliefs was also found to be a significant predictor of traumatic reactions in the current model.

Relationships within the model suggest that the disruption of core beliefs that has resulted from the traumatic incident is related to posttraumatic growth stemming from it. However, posttraumatic stress is not related to posttraumatic growth but the disruption of core beliefs that is caused by the traumatic incident is related to posttraumatic stress. There are two possible interpretations of this. Firstly, it could be that there is a sub-set of participants, for whom the disruption of core beliefs leads to posttraumatic stress, but not to posttraumatic growth. Alternatively, if posttraumatic growth develops over time (Polantinsky & Esprey, 2000) then these individuals may be currently experiencing traumatic reactions, which have yet to evolve into posttraumatic growth.

However, there was also a significant negative path between mindset and posttraumatic growth suggesting an alternative pathway to growth, which does not involve either the disruption of core beliefs or traumatic reactions. This negative relationship suggests that individuals with higher levels of resilience, optimism and extraversion and lower levels of neuroticism experienced lower levels of posttraumatic growth. Initially this may appear counter-intuitive, as research has consistently demonstrated positive relationships between posttraumatic growth and both extraversion (Tedeschi & Calhoun, 1996; Sheikh, 2004; Linley & Joseph, 2004) and optimism (Tedeschi & Calhoun, 1996; Helgeson et al, 2006; Prati & Pietrantoni, 2009). However, previous research has also suggested that higher levels of resilience are associated with the lowest levels of posttraumatic growth (Tedeschi & Calhoun, 2004). Thus, these traits combined together may constitute a 'fully functioning individual' and consequently mean that they have less 'room' for growth. Such individuals may feel that they have no need for growth and are therefore unwilling to engage in the process of posttraumatic growth. It could be that because these individuals have high levels of resilience when confronted with a traumatic incident they may experience some degree of short-term dysregulation in their emotional and physical well-being (Carver, 1998) but these reactions will be relatively brief and not to the extent that their functioning is

significantly impeded (Westphal & Bonanno, 2007). Similarly, research has suggested that individuals who display high levels of optimism in the face of traumatic events are more stress resistant (Charney, 2004). Alternatively, it is theoretical plausible to suggest that as this pathway bypasses the impact of a traumatic incident it may be reflecting naturally occurring growth as opposed to posttraumatic growth. This could be either normal maturational growth (mean age of the sample was 43.3) or growth derived from working within an organisation where the ethos is one of continuous learning and personal development.

Tedeschi and Calhoun (2004) argue that resilient individuals will be less challenged by traumatic events because of the coping capacities that they have. The direct negative relationship between mindset and coping that was found in the model could be interpreted as providing support for this assertion, as it may be that individuals who have developed this mindset (which could be considered a positive one) are already coping effectively and therefore, have no need to use coping mechanisms. Alternatively, this could be viewed, as individuals who need to use a lot of coping strategies are low in resilience.

One possible explanation for the associations found in the current model could be related to the debriefing processes and close co-worker relations, which are an integral part of the workings of the Fire and Rescue Service. Participants in study one spoke about two distinct types of debriefing; the first one was organisational led and is conducted by the Officer in charge following the completion of an incident and the second one constitutes a more informal debriefing with fellow members of the watch, generally over a cup of tea, on the crews return to the station. According to participants in study one, this informal debriefing provided the opportunity for members of the watch to discuss their thoughts and feelings about the incident in a safe and reciprocal environment. There is some evidence to suggest that self-disclosure about one's reactions to a traumatic event may affect the process of posttraumatic growth (Lindstrom et al, 2013). In a study undertaken by Taku, Tedeschi, Cann, and Calhou (2009), individuals who shared their experiences of a traumatic event with others and experienced mutual disclosure reported more posttraumatic growth than individuals who did not. This research was recently extended by Lindstrom et al. (2013), who found that disclosure about the negative consequences of a traumatic event was associated with deliberate rumination soon after the event. Within dominant models of growth, it is this deliberate rumination that allows individuals to reconstruct their worldview and find meaning in their traumatic experience, which ultimately leads to growth (Calhoun & Tedeschi, 2010). Thus, if firefighters do take the opportunity afforded by these debriefs to disclosure their emotional reactions to incidents they have attended this may foster the beginning of deliberate rumination that is needed for posttraumatic growth to occur. However, Lindstrom et al. (2013) also found that individuals who discussed positive consequences of their traumatic experience reported more deliberate rumination soon after the event and less current stress associated with the event than those who had not discussed positive consequences. They suggested that not only do higher levels of

deliberate rumination increase the likelihood of disclosure but disclosure, particularly that which is reinforced or socially acceptable may in turn increase the likelihood of deliberate positive rumination about the traumatic event (Lindstrom et al, 2013). Thus, it is possible that the camaraderie amongst firefighters, not only provides a buffer against the symptoms of posttraumatic stress disorder, as suggested by Tuckey and Hayward (2011) but also provides a way of facilitating and promoting posttraumatic growth.

A prevalent theme throughout participant's accounts in study one was the idea that every day was a learning day and part of the debriefing process involved talking about what went well, what could be learnt from the incident for the future and what could have been done better. This re-appraisal of the incidents allowed participants to take something positive away from incidents where the end result had been ultimately negative, death or serious injury. Thus, once again debriefing the incident in this way could start the deliberate rumination that is believed to be a potential pathway to posttraumatic growth. However, although this provides a theoretically plausible explanation neither self-disclosure or rumination was measured in this programme of research and consequently, further research needs to be undertaken to investigate the potential pathways through which the disruption of core beliefs can lead directly to growth.

8.4 Limitations of the Study

It must be acknowledged that SEM is considered to be a large sample analysis technique (Schreiber et al, 2006) and although the sample in the current study significantly exceeded Weston and Gore's (2006) recommended minimum, a sample size of 331 is still relatively small in SEM. A larger sample would increase the statistical power in the model and although there are inherent difficulties in accessing and recruiting participants from this unique population these results need to be treated as suggestive until they can be replicated in a larger sample. More participants would also allow for the testing of the full theoretical model of posttraumatic growth, which may provide a better fitting model.

Although early exponents of SEM believed that this technique offered a means of testing causal hypothesis, using non-experimental data this belief was in fact erroneous (Hoyle, 2011). As all measures in the current study were collected concurrently, causality may be inferred but cannot be confirmed. Further longitudinal research would be needed to clarify the direction of associations and untangle the complex relationships between these variables over time. However, whatever the direction of association may be, the fact that the model explains 45% of the variance in posttraumatic growth suggests that the disruption of core beliefs, coping, personality, resilience and optimism are all important variables in the process of posttraumatic growth and as such warrant further investigation.

8.5 Conclusion to Chapter

This chapter has presented the results of testing the theoretical model of growth that was developed from the data obtained in study one. The model was a reasonable but not excellent statistical fit. However, as has been discussed due to the model complexity and sample size the model had to be scaled down and a number of variables removed. Although a sample size in excess of 500 was obtained, a number of responses were only partially completed and therefore, were excluded from data analysis (see 7.2). It is possible that the full theoretical model would have provided a better fit but there is currently no way of testing this. The last chapter will draw together the overarching findings from both the qualitative and quantitative studies and discuss these in relation to the extant literature.

Chapter Nine: General Discussion and Integration of Findings

This chapter synthesises and integrates the findings and discussions presented within this thesis, and is structured around the main aims and research questions that were addressed by this programme of research.

9.1 Summary of the Thesis Aims and Findings

The main aim of this thesis was to develop a model of posttraumatic growth within a critical occupation, the UK Fire and Rescue Service. This constituted an original contribution to knowledge as dominant models of posttraumatic growth, to date, have been developed, using quantitative data from general population samples (Tedeschi & Calhoun, 1996). These dominant models argue for a commonality of experience in posttraumatic growth, which can be captured in five categories (Calhoun & Tedeschi, 2013). However, there are other researchers that argue some individuals may experience growth in ways which may not fit into these categories and without more qualitative research we cannot fully evaluate individual's subjective experience of growth following trauma (Ramos & Leal, 2013). The use of a grounded theory approach in the current study enabled such an evaluation.

There are key differences between the way in which the general population and firefighters experience trauma, which made them an ideal sample with which to develop a model of posttraumatic growth. Unlike the general population who experience a wide variety of traumas in varying contexts firefighters are repeatedly exposed to potentially traumatic events whilst carrying out their daily working activities (Berger et al, 2012) and are therefore considered to be at higher risk of developing posttraumatic stress disorder (Haslam & Mallon, 2003). Thus, firefighter's engagement with trauma is routine, expected and actively engage in contrast to the general population whose exposure to traumatic events is generally rare, unexpected, unpredictable and passively engaged in (Brunsden, Hill, & Maguire, 2014). In contrast to the general population firefighters also always experience trauma in the context of being part of a group as they do not operate individually but work in tight knit teams known as 'the watch'. Additionally there are also well-defined social support systems (a central tenant of current theories of growth) and ways of coping within the Fire and Rescue Service which make this a useful arena in which to explore current theories of growth.

Although a model of growth has previously been developed using participants from the Fire and Rescue Service (Armstrong et al, 2014) there are significant differences between this model and the one developed in the current research. The first obvious difference relates to samples and although both models were developed using firefighter samples Armstrong et al. (2014) used participants from the Australian Fire and Rescue Service whilst the current research was undertaken with the UK Fire and Rescue Service. Although previous research has suggested cross cultural similarities in firefighter populations (Blaney & Brunsden, 2015), there are also likely to be significant differences in the nature of calls they attend, the

frequency of the calls and the ways in which they carry out their jobs meaning that research conducted in one country is not necessarily directly relevant to another (Brunsden, Hill, & Maguire, 2014). This together with previously identified cultural differences in the experience of posttraumatic growth (Taku, 2013) means that it is possible that the Armstrong et al's. (2014) model may be culturally specific.

However, more importantly there are key differences between the methods and methodologies employed in the two studies. Armstrong et al. (2014) used a quantitative approach and Calhoun & Tedeschi's (2013) model as a conceptual framework to explore the determinants of posttraumatic growth whereas the current research used a qualitative approach, grounded theory, to develop the model of growth, which was then tested using quantitative measures. Additionally, Armstrong et al's. (2014) model of growth examined multiple sources of trauma, trauma experienced in both a work context as well as trauma experienced in participant's private lives. They hypothesised that experiencing trauma in both a work and non-work context would be related to higher levels of PTSD symptoms and thus higher levels of posttraumatic growth (Armstrong et al, 2014). Results supported this hypothesis as experiencing work related and personal trauma was related to increases in both symptoms of PTSD and posttraumatic growth. However, the current research chose to explore posttraumatic growth in the Fire and Rescue service because of their unique position in experiencing trauma as part of their daily working lives and therefore participants were requested to only include traumatic events they experienced in their job.

Calhoun & Tedeschi's (2013) model of growth suggests that individual's experiences of posttraumatic growth are influenced by contextual and personal factors. In line with this, the variables included in the Armstrong et al. (2014) model were sources of trauma, organisational belongingness, social support and coping. Results of regression analysis suggested that thirty-one per cent of variance in posttraumatic growth scores was accounted for by these variables (Armstrong et al, 2014), suggesting that they are important factors in the process of posttraumatic growth. However, Armstrong et al. (2014) hypothesised that social support and coping would be the strongest predictors of posttraumatic growth but in fact results showed that social support was not a significant predictor and the only coping strategy to reach significance was self-care coping. In contrast, using a qualitative approach in the current research enabled identification of many coping strategies that firefighters used in the aftermath of incidents several of which were related to posttraumatic growth. Furthermore, when the model was operationalised and tested five of the twelve coping strategies measured by the COPE (Carver, Scheier, & Weintraub, 1989) were related to increases in posttraumatic growth.

In developing and testing this theoretical model four other aims of the thesis were achieved; firefighters cognitive appraisal and reappraisal of traumatic events were detailed, the typology and prevalence of posttraumatic growth amongst firefighters was established, the correlates and predictors of posttraumatic growth were identified and the effect of age, sex,

length of service and time since the traumatic event on the individuals experience on posttraumatic growth was examined. The overarching findings aligning to each research question will now be reviewed in turn, extracting relevant findings across both the qualitative and quantitative studies of the thesis.

Research questions were clustered into three main groups (see 1.3), the first of which, centred on the prevalence and nature of posttraumatic growth within this population. The first three research questions within this group were used to establish the prevalence of posttraumatic growth and posttraumatic stress within this population and determine whether posttraumatic growth could exist in the absence of posttraumatic stress.

9.2 Prevalence and Nature of Posttraumatic Growth

Firstly, findings across both qualitative and quantitative approaches supported those of previous research (Armstrong et al, 2014), in demonstrating that posttraumatic growth is a possible outcome for firefighters as a consequence of dealing with traumatic incidents, which form part of their daily working lives. All participants in the qualitative study reported experiencing posttraumatic growth and within the quantitative study, the vast majority (88%) of firefighters, reported experiencing at least some degree of posttraumatic growth. These results were comparable with previous research using both general population and firefighter samples. For example, a review of 39 studies carried out by Linley and Joseph (2004), included a wide variety of trauma types, and reported that typically 30-70 per cent of individuals who experienced a traumatic event reported positive changes in one or more areas. Kehl et al. (2014), using a large sample of firefighters from eight European countries including the UK, reported that 51.7% of participants experienced some degree of posttraumatic growth. This is an important finding as firefighters are frequently exposed to potentially traumatic incidents in the way that the general population are not and thus perceiving positive benefits from the work that they do may help to maintain their well-being and ensure that they remain in their work-role for longer (Armstrong et al, 2014). Findings of the qualitative study provided support for the idea that there is commonality in the experience of posttraumatic growth (Calhoun & Tedeschi, 2013) as participant's accounts aligned with four of the domains of growth suggested by Tedeschi and Calhoun (1996). Within both empirical studies, the highest levels of posttraumatic growth were reported within the domains of increased appreciation of life followed by personal strength.

9.3 Role of Spirituality in Posttraumatic Growth

Very little posttraumatic growth was reported within the domain of spiritual change in either the qualitative or the quantitative studies, suggesting that this is not a valid domain of growth within this population. Rossmann and Wilson (1985) posit that one of the benefits of combining qualitative and quantitative approaches enables corroboration of each other through triangulation and as both studies have elicited very similar findings greater confidence can be placed in the results (Johnson & Onwuegbuzie, 2004). Several possible explanations have been offered across previous chapters to account for these findings. It

may simply be that the UK Fire and Rescue Service is composed of individuals with very low levels of religious beliefs. The majority of participants in study one defined themselves as "not religious", which appears to accord with recent statistics published by the Government in which 35% of British firefighters declared themselves as having "no religion" (Home Office, 2016). Therefore, even if firefighters did experience positive benefits from engaging with traumatic incidents this did not extend to changes in their religious beliefs. What is not known, however, is whether members of the Fire and Rescue Service were not religious when they joined the Service or whether working within this environment has led to a repudiation of religious beliefs. A view commonly expressed by participants in study one was that it was very difficult to maintain any sort of religious beliefs when one had to deal with events that involved unexplainable loss of life. Difficulties in maintaining faith in religious beliefs became particularly salient when dealing with events that involved the loss of children's lives and these types of events often lead to disillusionment with religious faith. Given the unique culture and strong sense of shared values in the population under investigation, it is possible that this represented the views of many of the participants in study two as well. As low rates of growth in the domain of spiritual change have also been documented in paramedics (Oginska-Bulik & Kobylarczyk, 2015) and police officers (Burke, Shakespeare-Finch, Paton, & Ryan, 2006) it is possible that the findings of the current study were reflecting the specific views of emergency service workers, who likely deal with very similar types of incidents. These findings do provide strong support, however, for Joseph (2011) assertion that religiosity and spirituality should be excluded from the definition of posttraumatic growth (a full discussion of this debate was provided in section 5.10) and this domain of growth should be excluded from any interventions that are designed to promote posttraumatic growth within the UK Fire and Rescue Service.

Alternatively, a second theoretically plausible explanation of these findings is that they are reflecting cultural differences, which, exist in the expression of posttraumatic growth. As such, this provides support for the body of research that has suggested that this domain of growth reflects the importance of religion and personal spirituality inherent in contemporary American society (Pals & McAdams, 2004; Morris et al, 2005; Shakespeare-Finch & Copping, 2006). Znoj (2005) posited that European populations were unlikely to endorse spirituality items and do not view religiosity as a form of strength and this did appear to be the case in the current study. Thus, in terms of practical application whilst an occupational health department within the US Fire Service may wish to promote the spiritual change domain of posttraumatic growth these findings suggest that this would not be appropriate within the UK Fire and Rescue Service.

However, it should be acknowledged, that posttraumatic growth was measured in the current study with the original Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), which contains only two items measuring the spiritual change factor (one focusing on religiosity and the other on spiritual understanding). It has been argued that two items are insufficient to capture spiritual and religious change (O'Rourke et al, 2008) and as an

attempt to address these criticism the Posttraumatic Growth Inventory – X (PTGI-X; Tedeschi et al, 2017) has recently been published which includes four additional items designed to measure spiritual-existential change. The purpose of this new inventory was to capture posttraumatic growth amongst individuals who are non-religious but experienced positive changes in existential and spiritual beliefs as part of their post-trauma experience. Although considered unlikely, given that the results of the qualitative analysis unequivocally demonstrated that participants did not endorse spiritual change as a valid domain of growth, it is not known if administering the new PTGI-X (Tedeschi et al, 2017) would have resulted in any differences in the findings of study two in relation to this domain of growth.

9.4 Prevalence and Role of Posttraumatic Stress in Posttraumatic Growth

The majority of participants, in the quantitative study, reported only minimal symptoms on the measure of traumatic reactions that was used (PDS-5; Foa et al, 2016) with 10.6% of firefighters at or above the proposed cut off score for a possible diagnosis of PTSD. These figures are low in comparison to some other research conducted with emergency services personnel; for example, Heinrichs et al. (2005) reported a 20% prevalence rate of PTSD in American firefighters. However, the rates in the current study were in line with other studies in the UK Fire and Rescue Service, Durkin (2010) reported that 11% of firefighters met the proposed cut off scores for a possible diagnosis of PTSD.

However, the findings regarding the place of traumatic reactions in the model of posttraumatic growth were seemingly discordant across the two empirical studies. In the qualitative study, all of the participants reported experiencing both symptoms of posttraumatic stress and posttraumatic growth whilst in the quantitative study although higher rates of posttraumatic growth was reported by those who experienced posttraumatic stress, posttraumatic growth was still experienced by those who did not report currently experiencing posttraumatic stress. Furthermore, when the grounded theory model was tested using structural equation modelling no significant path was found between posttraumatic stress and posttraumatic growth. Thus, although some analysis (e.g. correlation) suggested a relationship between these variables, in the SEM model the variance in posttraumatic growth was explained by other variables. Whilst this does not mean that individuals who had symptoms of posttraumatic stress did not experience posttraumatic growth it does mean that, the extent of posttraumatic growth was not explained by the differences in posttraumatic stress. As such, this finding is discordant with previous research, which has suggested that the relationship between posttraumatic growth and posttraumatic stress is a function of the intensity of posttraumatic stress (Butler et al, 2005).

Results of the SEM model, however, suggested the existence of different paths to posttraumatic stress and posttraumatic growth. The relationship between mindset and traumatic reactions was mediated by reaction to the event in terms of the disruption of core beliefs. Similarly, there was a positive relationship between mindset and disruption of core

beliefs and a subsequent positive relationship between this disruption and posttraumatic growth. However, there was also a negative direct relationship between mindset and posttraumatic growth, meaning that firefighters who were higher in resilience, optimism and extraversion and lower in neuroticism showed less posttraumatic growth. One possible explanation of this is that firefighters who were already resilient and optimistic had less 'room' for growth, which appears consistent with Tedeschi and Calhoun's (2004) position that resilient individuals are likely to report relatively little posttraumatic growth. An alternative explanation could be that this relationship is reflecting naturally occurring growth, distinct from posttraumatic growth, as it has bypassed the impact of a traumatic incident. Given the prevailing culture of continuous learning and development that exists within the UK Fire and Rescue Service, as articulated by all the participants in study one, it seems likely that at least some firefighters will experience naturally occurring growth.

There are several possible explanations for the seemingly discordant findings regarding the place of traumatic reactions across the two empirical studies. Firstly, the findings of study one may have been a result of the sampling strategy that was used. Participant recruitment for study one, was undertaken by placing adverts on the intranets of two regional Fire and Rescue Services. These adverts explained that the interviews would seek to explore individual's experiences of trauma and their subsequent reactions to it. Although the purpose of the research was stated to be the investigation of the positive effects of exposure to traumatic incidents, it was noticeable that participants arrived for the interviews expecting to talk about negative traumatic reactions. As much as there is a focus on the negative effects of traumatic exposure on firefighters within the academic literature (Armstrong et al, 2014) this also exists within the Fire and Rescue Service itself where there is very little knowledge or understanding of the construct of posttraumatic growth (Shakespeare-Finch et al, 2003). One of the participants in study one articulated the view that the positive things were often ignored as it was viewed as somehow not politically correct to talk about positives in the aftermath of critical incidents in which people had died. This was reflected upon at the time and changes made to the interview schedule after the fourth participant (see 5.2). However, it is possible that the way in which firefighters interpreted the advert led only those to volunteer who had experiences of negative traumatic reactions. Perhaps firefighters who had experienced growth in the absence of the symptoms of posttraumatic stress felt that they had nothing to contribute to the study. It is also possible that firefighters who volunteered to participate did so because they wanted the opportunity to talk about distressing experiences and their subsequent negative emotions, which they had not previously shared with others. During the interviews, several participants did communicate that they had not spoken about these incidents or their feelings about them before and reported feeling better for talking about them.

Secondly, an alternative explanation is that some of the participants in study two, who reported no symptoms of posttraumatic stress, had experienced traumatic reactions immediately following their traumatic event but had resolved these over time and were no

longer experiencing them when they took part in the research. In line with other cross-sectional research in this area, undertaken with both general population (Morris et al, 2005; McCaslin et al, 2009) and firefighter samples (Regehr et al, 2001; Sattler, Boyd, & Kirsch, 2014; Levy-Gigi et al, 2016) participants were asked to report on past traumatic events and current levels of traumatic reactions. Traditional measures of PTSD symptoms such as the Posttraumatic Diagnostic Scale for DSM 5 (Foa et al, 2016), which was used in study two, requires participants to rate their PTSD symptoms over the last month. Thus, traumatic reactions experienced prior to this may not have been captured. In addition and again in line with previous research levels of PTSD symptoms were measured without reference to time of onset (Levy-Gigi, et al 2016). It has been argued that, collecting such data within firefighter populations would be challenging, as it is unlikely that there was a single point in time in which firefighters developed symptoms of posttraumatic stress, rather it is likely that different symptoms evolved after different traumatic incidents (Ibid). However, whilst it is possible that some of the participants who reported no current traumatic reactions had experienced them at the time of the traumatic incident but had subsequently resolved them, this is thought to be unlikely. Anecdotal evidence from participant's accounts in the qualitative study suggested that for many firefighters, the symptoms of posttraumatic stress tended to be enduring, and were still being experienced many years after the traumatic incident, which had led to their development. Whilst the possibility does exist that this sample may have self-selected because of unresolved trauma previous research has also evidenced the chronic duration of posttraumatic stress symptoms within firefighter samples (Hill & Brunsden, 2009).

Thirdly, previous research with firefighters has suggested that they may have minimised negative responses due to a reluctance to portray either themselves of their profession in a negative light (Skeffington et al, 2017). However, this again is thought to be unlikely, participants in study one appeared open and honest in their disclosure of negative reactions to trauma, participation in study two was completely confidential and anonymous, and this anonymity of response has been argued to reduce the potential for self-report bias (Shakespeare-Finch et at, 2015).

Lastly, although it is recognised that because of their daily working activities firefighters do have an elevated risk of developing symptoms of posttraumatic stress (Corneil et al, 1999) the majority of firefighters do not develop psychological problems as a result of dealing with traumatic incidents (Lambert et al, 2012). Despite this posttraumatic growth has been consistently reported within this population (Durkin, 2010; Kehl et al, 2014; Armstrong et al, 2014). These findings do, however suggest, that further exploration of the relationship between traumatic reactions and posttraumatic growth is warranted and a longitudinal design would be most appropriate to do this, as it would allow for the development and possible resolution of traumatic reactions to be captured over time. Any future research should also attempt to include the experiences of retired firefighters and early service leavers, which may help to provide a more comprehensive understanding of these variables.

9.5 Is Posttraumatic Growth Cumulative?

The question as to whether posttraumatic growth was cumulative or related to a specific event also sat within the first cluster of research questions. In line with previous research (Regehr et al, 2003; Prati et al, 2012) length of service was used as a proxy for traumatic exposure, when inferential statistics were performed, and in doing so no significant relationship was found length of service and posttraumatic growth. Talking to firefighters it became apparent that there is always one particular incident that has a lasting impact but firefighters in study one expressed the view that over time one becomes "hardened to it" and incidents came to be seen as traumatic for the casualties but not for themselves. This is consistent with the findings of previous research that suggested over time emergency services workers experience a certain degree of desensitization, which allows them to function in an empathetic, yet detached manor (Wright et al, 2006). Whilst experiencing traumatic events is not sufficient in itself to facilitate posttraumatic growth it provides the potential for growth to occur (Joseph & Linley, 2005) and thus, if there is a certain point after which incidents are no longer perceived as traumatic then there is no opportunity for cumulative posttraumatic growth to occur. However, Halpern, Gurevich, Schwartz, and Brazeau (2009) suggest that this may be more complicated as experience is likely to interact with a variety of other factors such as personality and coping strategies to the extent that individuals who cope well are inoculated against further traumatic exposure whilst those who cope poorly are not. The relationships illustrated in the SEM model can be seen as providing some support for this position. For example, the direct negative relationship between mindset and posttraumatic growth may suggest that firefighters high in mindset have developed a mindset, which leaves little room for growth or alternatively renders them unwilling to engage in the process of posttraumatic growth. Secondly, there was also a direct negative relationship between mindset and coping, which could be interpreted as firefighters who have developed this positive mindset did not need to utilise a lot of coping strategies or perhaps were unwilling to do so. However, further longitudinal research would be able to tease apart the individual contributions of each of the various factors implicated in the process of posttraumatic growth.

9.6 The Effect of Sex and Age on Posttraumatic Growth

Questions as to the effect of sex and age on posttraumatic growth were also posed in this thesis, together with whether it was possible to disaggregate between naturally occurring growth over a lifespan and posttraumatic growth. Much of the extant literature has found females reported greater posttraumatic growth than males (Tedeschi & Calhoun, 1996; Bellizzi, 2004; Vishnevsky et al, 2010), which Tedeschi and Calhoun (1996) suggested is because females differ in their response to trauma. Although the sample for study two was not balanced in terms of sex; 297 participants were male and only 29 were female, females constitute only approximately 5% of operational staff in the UK Fire and Rescue Service and thus, having more females in the sample would have led to over representation. However, no significant differences were found between the posttraumatic scores of males and

females in the current study. Thus, it may be that within this population the way in which trauma is responded to not determined by sex but by the strong culture and clear procedures that exist. Similarly, age had no effect on posttraumatic growth scores within the current study. One potential explanation of these findings could be that they reflect a lack of diversity in the sample however this was clearly not the case in the current study, as there was considerable diversity in the samples of both empirical studies in terms of age, length of service and role. Thus, a much more likely explanation is that the behaviour of firefighters at work is not determined by either sex or age, but rather by a strong sense of shared values, shared experiences and a unique culture. Evidence for this was provided in participant's accounts in study one in which there was a great deal of similarity in their views and opinions and even in the way they articulated these, often using the same language and phrases. However, whilst these similarities existed, in line with previous research, (Brazil, 2017) individuals still experienced trauma in different ways suggesting that the experience of trauma is highly subjective.

9.7 The Effect of Time Since the Event on Posttraumatic Growth

The question regarding the effect of time since the traumatic event on the development of posttraumatic growth was contained within the second cluster of research questions and was considered an important variable to investigate in the current programme of research as previous inconsistency in findings has suggested that this is currently not well-understood (Morgan & Desmarais, 2017). The range of time since the traumatic event captured in the current study was considerable (1-35 years), meaning greater confidence could be placed in the results. The finding that the greater the length of time since the traumatic event occurred the more growth that participants experienced adds support to the idea that that posttraumatic growth is a process that gradually unfolds over time as individuals accommodate the new trauma related information (Joseph & Linley, 2005). However, if posttraumatic growth is a process, what is not clear is what stage of this process participants were at when they took place in this research. It is also possible that participants who reported no posttraumatic growth had actually experienced posttraumatic growth immediately following the incident or incidents, which they perceived as traumatic, but were no longer experiencing this at the time they took part in the study. A second research question in this group pertained to whether posttraumatic growth is an enduring phenomenon or something that fades over time. Whilst this could not be answered by the quantitative study, because of the cross-sectional design, evidence from participant's accounts in study one suggested that posttraumatic growth, particularly in the domain of increased appreciation of life was sometimes fleeting. Participants acknowledged that encountering traumatic events that involved death and destruction did provide a pathway to an increased appreciation of life but for some this only lasted for a short period after the incident and did not translate to behavioural changes.

A further research question within this cluster pertained to whether posttraumatic growth is continuous or subject to a ceiling effect. The direct negative path that was found between

mindset and posttraumatic growth in the SEM model offers some explanation of this as it suggests that individuals who have higher levels of resilience, optimism , extraversion and lower levels of neuroticism experience lower levels of growth. However, further longitudinal research is warranted, which could assess posttraumatic growth at multiple time points to further our understanding of the effect that time has on these positive adaptations to traumatic events.

9.8 Disruption of Core Beliefs and Posttraumatic Growth

The third cluster of research questions centred around the relationships between posttraumatic growth and other factors, which were either identified within the extant literature or resulted from data provided by participants in study one. The most important question within this group relates to the relationship between the disruption of core beliefs and posttraumatic growth as previous literature has suggested that the challenge to core beliefs is the critical factor in initiating the process of posttraumatic growth (Taku & Oshio, 2015). In line with these findings, the disruption of core beliefs was consistently found to have a strong relationship with posttraumatic growth across studies within this thesis. Within the qualitative study, there was some evidence of the shattering of core beliefs within participant's accounts. For example, the traumatic incident spoken about by Simon involved the death of a small child and was purely the result of accidental circumstances, a number of factors combining at a particular time without explanation. Consequently, Simon struggled to understand and make any sort of meaning out of the event and similarly other participants reported having problems coming to terms with incidents that involved the serious injury or death of children. This is consistent with previous research involving emergency services personnel, which has documented the additional poignancy, attached to incidents involving children (Halpern et al, 2009). If an individual's assumptions about the world are that, the world is benevolent, meaningful, controllable and predictable (Janoff-Bulman, 1992) it is plausible to suggest that incidents, which involve children severely, challenge these beliefs and in some cases such as Simon's shatter these beliefs. As a result, Simon suffered some of the most severe and enduring negative reactions seen within participants accounts but also reported some of the highest levels of growth within the qualitative analysis. Inferential statistics further supported the relationship between core beliefs and posttraumatic growth as a correlation revealed a very strong positive relationship between the two constructs (in contrast to the correlations performed between posttraumatic growth and other variables such as optimism, resilience, age, length of service). This association was also replicated in the SEM model in which the strongest direct relationship was between core beliefs and posttraumatic growth. Previous research has suggested that without this initial challenge to core beliefs, posttraumatic growth is unlikely to occur (Cann et al, 2010) and whilst these strong associations suggest that this is likely an important factor in the process of posttraumatic growth, results of the SEM model also revealed a direct link between mindset and posttraumatic growth. Thus, for some

participants, it would appear that there are pathways to growth, which do not involve the disruption of core beliefs. More research is needed to further elucidate these pathways.

9.9 Personality/Coping and Posttraumatic Growth

The findings of this study also provide further support for the assertion that pre-trauma characteristics play an important role in the development of posttraumatic growth (Tedeschi & Calhoun, 1996). Which personality factors are associated with posttraumatic growth was one of the research questions posed and regression analysis found both extraversion and neuroticism to be significant and positive predictors of posttraumatic growth. The finding that extraversion was the strongest predictor of growth when a regression analysis was performed was unsurprising given that this was also the personality trait most associated with posttraumatic growth in the general population (Tedeschi & Calhoun, 1996) and also emergency services personnel (Shakespeare-Finch et al, 2005). Evidence suggests that extraverted individuals are more likely to have positive attitudes to emotional expression, believing that if they express emotion people will understand them and not feel burdened by it (Nightingale & Williams, 2000). This emotional expression in interpersonal interactions is theorised to promote posttraumatic growth (Jia et al, 2015). Furthermore, previous research has also reported a significant positive association between extraversion and the coping strategy of positive re-appraisal in a sample of police officers (Burke et al, 2006). Participants accounts in study one evidenced the importance of positive re-appraisal in dealing with traumatic incidents and this coping strategy has been consistently associated with higher levels of posttraumatic growth (Sears et al, 2003; Helgeson et al, 2006); Yeung et al, 2016). Previous research has found evidence of a relationship between extraversion and positive affect and simply by acting extraverted individuals can experience positive feelings and an increased sense of well-being (Fleeson et al, 2002). Thus, the finding that extraversion is a predictor of growth, is important in that it supports the development of interventions promoting attitudes, expectancies and behaviours aligned with this personality trait.

The finding that neuroticism was also a predictor of posttraumatic growth was less understandable and more difficult to explain. However, previous research has evidenced a significant positive association between neuroticism and the coping strategy of mental disengagement (Burke et al, 2006), which was reportedly used by participants across both studies when dealing with potentially traumatic incidents. Although mental disengagement has traditionally been viewed as being maladaptive and counter-productive to recovery (Kirby et al, 2011) in the current study it was positively related to posttraumatic growth.

Paton (2005) suggested that understanding the relationship between posttraumatic growth and personality is important but becomes particularly significant in the realm of the emergency services as personality factors can potentially be used to inform selection procedures. However, whilst this is the position taken by some researchers it is also important to consider the ethical challenges that this might pose. Koocher and Rey-Casserly

(2003) argue that there are core ethical challenges in the use of personality assessment and psychologists have a responsibility to ensure that they appropriately use psychological science to make decisions whilst recognising the full limitations of these methods and the legal and human rights of the individuals whose lives will be influenced by the results. The validity of personality assessment is a much contested area within psychology with some researchers arguing that personality is much too complicated to be measured accurately by what is often essentially a multiple choice test (Viswesvaran & Ones, 2016). Recent research by Marshall, Milligan-Saville, Mitchell, Bryant, & Harvey (2017) investigated the usefulness of pre-employment checks for emergency service workers and concluded that further research was needed before an assessment could be made on the overall utility of such procedures. Thus, it may be prudent to exercise caution in interpreting findings to inform selection procedures as it could mean that Individuals may miss out on potential career opportunities who could otherwise have had long and fulfilling careers in the Fire and Rescue Service.

However, results from regression analysis, showed that personality factors predicted 4.4% of the variance in posttraumatic growth scores in study two, whilst coping explained 28.6% of the variance. Thus, what appears to be a much more important factor in the development of posttraumatic growth is the coping strategies that individuals utilise when faced with a traumatic event. These findings accord with previous research, which found that coping strategies explained the largest amount of variance in posttraumatic growth in a sample of Australian firefighters (Armstrong et al, 2014). These findings are important as they provide the Fire and Rescue Service with the opportunity to develop intervention to promote the specific coping strategies, which have been found, to enable positive adaptations to trauma.

9.10 Implications for Practice
The current programme of research has clearly demonstrated that firefighters are exposed to critical incidents in the course of their daily work, which can cause them to have strong emotional reactions, potentially leading to impairments in functioning (Mitchell, 1983). However, in addition to the potential for resulting negative traumatic reactions, which have tended to be the focus of the academic literature to date (Heinrichs et al, 2005; Meyer et al, 2012; Skeffington et al, 2016) , this thesis clearly evidences that positive benefits are also a possible outcome for firefighters as a consequence of dealing with these incidents. Blaney (2009) commented that the current practice within the UK Fire and Rescue Services was "weighed heavily towards disease diagnosis and treatment" (p.53) and data from study one together with observations made as a result of continued engagement with the Fire and Rescue Service suggest that despite the intervening years this is still very much the case.

Research carried out by Shakespeare-Finch et al. (2003) examining the prevalence of posttraumatic growth in Australian ambulance personnel concluded that there is a need to 'normalise' the positive benefits of engaging with traumatic incidents in much the same was as short term negative reactions are regarded as normal. Findings of the current research

211

concur with this conclusion. Comments made by participants in study one suggested that within the culture of the Fire and Rescue Service, it is not considered normal to focus on the positives following a traumatic incident. Although a clear theme that emerged from study one was re-appraisal of the event, this was achieved through analysing the incident in terms of a learning experience and extracting the positives on a non-emotional level. Thus, in order to facilitate and promote posttraumatic growth in this population a positive culture needs to be created, in which engagement with the positives of dealing with traumatic incidents on an emotional level is also encouraged. Firstly, the Fire and Rescue Service could address this by integrating the concept of posttraumatic growth into initial recruit training alongside discussions of negative reactions thus introducing the idea that both negative and positive adaptations are normal following attendance of traumatic incidents. It is important to remember, however, that the existence of posttraumatic growth does not necessarily negate the presence of negative traumatic reactions and participants in the qualitative study experienced both the symptoms of posttraumatic stress and posttraumatic growth. Secondly, the concept of posttraumatic growth could also be included in any occupational health programmes delivered to firefighters that are designed to promote health and well-being. Given the strong associations found between the disruption of core beliefs and posttraumatic growth, it seems very important to include information about what core beliefs are how they can be shattered and how this can lay the foundation for subsequent growth. Thirdly, the wider Fire and Rescue Service community could also have a role to play in creating this positive culture. For example, the home page of the Fire Fighters Charity website frequently includes stories of firefighters who have suffered PTSD, resulting from dealing with work related incidents, they could also request and include stories from personnel who have experiences of positive benefits as a result of engaging with traumatic incidents.

A fourth way of educating firefighters about posttraumatic growth would be to introduce the concept into the post incident debriefing process. Rather than an integrated UK wide approach, procedures and processes for debriefing vary across regions. For example, Tyne and Wear Fire and Rescue Service operate a trauma support team (Lawrence & Barber, 2004), which are involved in providing additional peer support to firefighters initially by way of assistance with de-briefing following potentially traumatic incidents. Where such teams exist, members of the team could be upskilled in the concept of posttraumatic growth in order that they could introduce this into de-briefing sessions. Consideration of time scales is also relevant here as it could reasonably be assumed that it is in the short term immediately following a critical incident that personnel may need help. However, findings from the current study suggested that both traumatic reactions and posttraumatic growth increase over time and therefore, consideration needs to be given to the provision of long-term assistance as well.

Findings suggest that the debriefing process is important in the experience of posttraumatic growth as three of the coping strategies identified as predictors of growth within this

population are implicated in this process; positive reinterpretation, focus on venting of emotions and use of emotional support. Recent research reported that attending (CISD) was positively associated with posttraumatic growth (Sattler et al, 2014). In line with this, findings of this study suggest that the Fire and Rescue Service should continue to advocate formal debriefing, encourage, and provide opportunities for the more informal debriefing that takes place with fellow watch members. Moreover, facilitators of debriefs should encourage personnel to self-disclose their thoughts and feelings about a traumatic incident to enable them to start making meaning of the event. The results of the current study also suggest that additional considerations need to be given to procedures surrounding retained firefighters. Analysis of data from study one revealed that some of the most severe and enduring traumatic reactions were experienced by firefighters following engagement with critical incidents whilst on retained duty. A significant factor in these cases appeared to be the lack of both formal and informal debriefing normally afforded to whole time firefighters.

In terms of practical applications, the similarities identified in participant's accounts in study one, could be taken to suggest that a one- size fits all approach is appropriate. However, caution should be exercised when considering such an approach as whilst these similarities may provide evidence of shared values and a unique culture at the same time the responses to traumatic incidents displayed by participants in study one were highly subjective. Although making a personal connection to the casualty, was commonly a critical factor in making an incident traumatic, each participant, individually defined this personal connection. Thus, a traumatic incident successfully dealt with by one person can cause severe distress to another individual, likely because different individuals ascribe different meanings to the same event (Carlier et al, 2000). One of the participants in study one spoke about the automatic mobilisation of additional support to watch members if they attended an incident, which involved a death. However, he felt that this was not always needed, and conversely there were other incidents where he felt either himself, or other watch members had struggled but support had not been automatically offered because the incident had not involved a death. Just as findings suggest that the experience of trauma is individualistic, this appears equally applicable to the experience of posttraumatic growth with the very high standard deviation in posttraumatic growth scores in the current study, evidencing the idiosyncratic nature of the phenomenon.

9.11 Future Directions for Research

In line with the findings of previous research, this thesis asserts that the process of posttraumatic growth appears to be a complex one involving the interplay of many factors (Lindstrom et al, 2013). One of the inherent strengths of the current programme of research was the number of correlates and predictors of posttraumatic growth that were examined and the resulting SEM model that was tested in chapter eight accounted for 45% of the variance in posttraumatic growth scores. Although the full model was not tested this does, however, suggest that other cognitive variables are likely involved in the process of posttraumatic growth that were not included in the current programme of research. Of

particular interest was the strong, direct and significant relationship that was reported between the disruption of core beliefs and posttraumatic growth in the SEM model coupled with the lack of a significant path between traumatic reactions and posttraumatic growth. Furthermore, the SEM model revealed a direct relationship between mindset and posttraumatic growth and thus, whilst the disruption of core beliefs is likely to important in the process of posttraumatic growth it is not the only pathway to growth. Some suggestions were put forward in chapter eight as to the potential pathways that could lead directly to posttraumatic growth but further exploration of this is warranted and future, research needs to include the variables of self-disclosure and rumination.

This thesis was an exploratory piece of research into a specific population and the cross-sectional design that was utilised has been described as an ideal method for achieving this (Shakespeare-Finch et al, 2003). Having identified a number of pre-trauma characteristics, coping strategies and event related variables that are important in the process of posttraumatic growth further longitudinal work is now required to investigate the directions of the relationships, how these factors interact over time and the implications of this on the long-term well-being of the individual.

Coping strategies that appeared to be most frequently used by participants in the qualitative study were primarily cognitive ones that allowed individuals to maintain emotional distance from the casualties. Such strategies have been previously well documented within the existing emergency services literature (Blaney, 2009; Halpern et al, 2009; Avraham et al, 2014). However, the strategy that was categorised within the analysis as 'blanking out faces' does not appear to have been extensively investigated to date. Although not all participants talked about using this strategy it appeared that it was used by firefighters whose role in the incident necessitated very close contact with a casualty (often when performing first aid). Thus, future research could investigate the prevalence and use of this strategy in order to establish whether there are any benefits to personnel from its use.

The possibility that family members could experience vicarious posttraumatic growth was introduced by participants data from study one. Whilst the concept of vicarious posttraumatic growth is now well recognized, within the literature, (Arnold et al, 2005) research does not appear to have examined the existence of vicarious growth in families of firefighters to date. This may provide a fruitful area for further research as it introduces the possibility that close family members of emergency services personnel, can also benefit from positive changes as a result of their loved ones daily working activities. It has been suggested, that the support of the family is paramount in reducing the impact of dealing with traumatic incidents on emergency services personnel (Regehr, 2009) and therefore promoting well-being in family members could also be considered crucial to the organisation.

9.12 Overall Limitations and Strengths of the Research

Limitations of the research have been previously discussed at the end of both empirical chapters, (see sections 5.14 and 7.13 respectively) and therefore, will not be repeated here. However, the main limitation relates to the cross-sectional nature of the study, consistent with the majority of posttraumatic research to date. The difficulties in accessing participants and collecting both pre-event and then post-event data make this a very difficult limitation to address and explains why the majority of research in this area remains cross-sectional. Although this design allows inferences regarding the strength of relationships between the variables within the study, causality cannot be established. Excepting that, there are difficulties in accessing participants pre exposure to traumatic events, further longitudinal research is needed to address this limitation. If further research were to be undertaken with emergency services personnel, the ideal scenario would be to engage participants prior to commencement of initial training and follow them during their career as they engage with their first and then subsequent traumatic incidents. However, careful consideration would need to be given to the issue of identifying critical incidents as findings have shown that trauma is ultimately subjective and therefore, it is not necessarily the incidents such as ones involving mass casualties, which one may think would be perceived as traumatic, that cause firefighters problems. Obtaining baseline measures and assessing posttraumatic growth at multiple time points would enable a detailed examination of the genesis and development of growth trajectories.

Again, in line with limitations, the strengths of each of the studies were considered at the end of each of the empirical chapters (see 5.14 and 7.13 respectively). However, there are a number of overall strengths in this thesis, which warrant further discussion. The first major strength of the research was the inclusion of both negative and positive indicators of a traumatic experience, which addressed one of the main limitations of traditional trauma research, which has historically viewed trauma as the presence or absence of negative symptomology (Morris et al, 2005). Including both measures enabled a more comprehensive picture of the effect that a traumatic incident can have on the individual and furthermore, also addressed the major criticism of posttraumatic growth research, which is that measurement tools for posttraumatic growth establish a response set that is biased towards positive change as they only include positive items (Ford et al, 2008).

The overall approach taken in the thesis constitutes the second overall strength. To date the majority of studies that have investigated firefighter's experiences of posttraumatic stress and posttraumatic growth have used quantitative methods (Armstrong et al, 2014). The sequential mixed methods approach used enabled the examination of the phenomenon from different perspectives, which meant that findings were robust and had strong academic integrity.

The third major strength of this thesis was the reflexive stance that was taken throughout the programme of research. Reflexivity is considered a key criterion in assessing validity in

qualitative research (Mays & Pope, 2000) and Strauss and Corbin (1998) advocate that a research journal is used to record the researchers thinking about the research area. In accordance with this a journal was used throughout to document thoughts, worries and problems, decisions made and rationale behind these together with reflections about the researchers position in the research process and how it may be influencing the findings. Thus, this journal effectively served to act as both an audit trail of the research process and a reflexive account.

However, the main implicit strength of this thesis was securing access to a real world sample of participants in a critical occupation. Studies with firefighters in the UK are comparatively rare (Alexander, 2015) and reflective of a good deal of real world research there were problems with accessing the sample and recruiting participants (particularly for study two). Recruitment became a very time consuming and protracted process, the details of which were discussed in section 7.2. However, the considerable efforts that were made yielded good results, and the final sample size for study two was substantial, which meant that confidence could be placed in the validity of the results.

9.13 Contribution of Thesis to the Research Area

In summary, this thesis has clearly evidenced original contributions to the research area. This has been achieved by:

- Developing a model of posttraumatic growth within a critical occupation, the UK Fire and Rescue Service
- Establishing the typology and prevalence of both posttraumatic stress and posttraumatic growth amongst firefighters in the UK.
- Informing the literature on firefighter's cognitive appraisal and re-appraisal of traumatic incidents, detailing the coping strategies, which, they use to protect their own well-being.
- Informing the posttraumatic growth literature on the correlates and predictors of posttraumatic growth within this population.
- Informing the posttraumatic growth literature on the effect of age, sex, length of service and time since the traumatic event occurred on individual's experience of posttraumatic growth within a developmental organisation, the UK Fire and Rescue Service.
- Outlining ways in which to create a positive culture within the UK Fire and Rescue Service to facilitate and promote posttraumatic growth.
- Establishing methods for educating firefighters about posttraumatic growth.

9.14 Conclusion

Having made an original and significant contribution to the research areas of posttraumatic growth, traumatic reactions, personality, resilience, coping and well-being, the current programme of research has clearly advanced knowledge and understanding in these areas.

References

Affleck, G., & Tennen, H. (1996), Construing Benefits from Adversity: Adaptotional Significance and Disposltional Underpinnings. *Journal of Personality,* 64(4), 899–922.

Agaibi, C.E., & Wilson, J.P. (2005). Trauma, PTSD, and Resilience, A review of the literature. *Trauma, Violence & Abuse, 6(3), 195-216.*

Aldwin, C.M., Levenson, M.R., & Spiro, A. (1994). Vulnerability and Resilience to Combat Exposure: Can Stress have Lifelong Effects?. *Psychology and Aging,* 9(1), 34-44.

Alexander, L. (2015). *When the bells go down: Resilience and Vulnerability in firefighters.* PhD thesis, University of Hertfordshire.

Alexander, D., & Klein, S. (2001). Ambulance personnel and critical incidents: Impact of accident and emergency work on mental health and emotional well-being. *The British Journal of Psychiatry, 178(1),* 76-81.

Almedon, A.M., & Glandon, D. (2007). Resilience is not the Absence of PTSD any More than Health is the Absence of Disease. *Journal of Loss and Trauma,* 12(2), 127-143.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th Ed.). Arlington, VA: American Psychiatric Publishing.

Amoako-Gyampah, K., & Acquaah, M. Manufacturing strategy, competitive strategy and firm performance: An empirical study in a developing economy environment. *International Journal of Production Economics,* 111, 575-592.

Andrews, R. (2010). The impact of modernisation on fire authority performance: an empirical evaluation. *Policy and Politics,* 38(4), 599-617.

Andrews, R., Ashworth, R., & Meier, K. (2014). Representative Bureaucracy and Fire Service Performance. *International Public Management Journal,* 17(1), 1-24.

Annells, M. (1997). Grounded theory method, part 1: within the five moments of qualitative research. *Nursing Inquiry,* 4, 120-129.

Arbuckle, J. L. (2014). Amos (Version 23.0) [Computer Program]. Chicago: IBM SPSS.

Archer, D. (1999). Exploring the "bullying" culture in the para-military organisation. *International Journal of Manpower,* 20(1/2), 94-105.

Armstrong, D., Shakespeare-Finch, J., & Schochet, I. (2014). Predicting post-traumatic growth and post-traumatic stress in firefighters. *Australian Journal of Psychology, 66,* 38-46.

Arnold, D., Calhoun, L.G, Tedeschi, R., & Cann, A. (2005). Vicarious Posttraumatic Growth in Psychotherapy. *Journal of Humanistic Psychology,* 45(2), 239-263.

Ashforth. B.E. (2001). *Role transitions in organizational life: An identity-based perspective.* Mahwah, New Jersey: Erlbaum.

Atkinson, P., & Coffey, A. (2002). Revisiting the relationship between participant observation and interviewing in J.F Gubrium & J.A. Holstein (Eds) *Handbook of interview research.* Thousand Oaks, CA: Sage)

Avraham, N., Goldblatt, H., & Yafe, E. (2014). Paramedics' Experiences and Coping Strategies When Encountering Critical Incidents. *Qualitative Health Research,* 24(2), 194-208.

Bain, G. (2002). *The future of the Fire Service: reducing risk, saving lives* - The independent review of the Fire Service. December 2002.

Barbour, R. (2001). Education and debate: Checklists for improving rigour in qualitative research: a case of the tail wagging the dog? *British Medical Journal,* 322, 115-117.

Bauwens, J., & Toscone, C. (2010). Professional Posttraumatic Growth After a Shared Traumatic Experience: Manhattan Clinicians' Perspectives on Post-9/11 Practice. Journal of Loss and Trauma, 15(6), 498-517.

Beaton, R., Murphy, S., Johnson, C., Pike, K., & Corneil, W. (1999), Coping responses and posttraumatic stress symptomatology in urban fire service personnel. *Journal of Traumatic Stress,* 12(2), 293–308.

Becker, H. (2007). *Telling about society.* University of Chicago Press: Chicago.

Bellizzi, K.M. (2004). Expressions of Generativity and Posttraumatic Growth in Adult Cancer Survivors. *The International Journal of Aging and Human Development,* 58(4), 267-287.

Bellizzi, K.M., Smith, A.W., Reeve, B.B., Alfano, C.M., Bernstein, L., Meeske, K., Baumgartner, K.B., & Ballard-Barbash, R.R. (2009). Posttraumatic Growth and Health-related Quality of Life in a Racially Diverse Cohort of Breast Cancer Survivors. *Journal of Health Psychology,* 15(4), 615-626.

Benight,C. C., & Bandura, A. (2004). Social cognitive theory of posttraumatic recovery: The role of perceived self-efficacy . *Behaviour Research and Therapy*, 42(10), 1129 – 1148.

Bensimon, M. (2012). Elaboration on the association between trauma, PTSD and posttraumatic growth: The role of trait resilience. *Personality and Individual Differences,* 52, 782-787.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological bulletin,* 107(2), 238-246.

Berger, W., Coutinho, E.S.F., Figueira, I., Marques-Portella, C., Luz, M.P., Neylan, T.C., Marmar, C.R., & Mendlowicz, M.V. (2012). Rescuers at risk: A systematic review and meta-regression analysis of the worldwide current prevalence and correlates of PTSD in rescue workers. *Social Psychiatry and Psychiatric Epidemiology, 47(6),* 1001-1011.

Bernabe, M., & Botia, J.M. (2015). Resilience as a mediator in emotional social support's relationship with occupational psychology health in firefighters. *Journal of Health Psychology,* 21(8), 1778-1786.

Blaikie, N. (1993). *Approaches to Social Enquiry.* Cambridge: Policy Press.

Blakely, H., & Moles, K. (2017). Interviewing in the 'interview society': making visible the biographical work of producing accounts for interviews. *Qualitative Research,* 17(2), 159-172.

Blaney, L.S. (2009). Beyond 'knee jerk' reaction: CISM as a health promotion construct. *The Irish Journal of Psychology,* 30(1-2), 37-57.

Blaney, L., & Brunsden, V. (2015). Resilience and health promotion in high risk professions: A pilot study of stress and coping in the Fire and Rescue Service in Canada and the United Kingdom (UK). *The International Journal of Interdisciplinary Organizational Studies,* 10(2), 23-32.

Bollen, K.A. (1989). *Structural equations with latent variables.* New York: Wiley.

Bonanno, G. A. (2004). Loss, Trauma, and Human Resilience: Have We Underestimated the Human Capacity to Thrive After Extremely Aversive Events? *American Psychologist, 59*(1), 20-28.

Bonanno, G.A. (2005). Resilience in the face of potential trauma. *Current Directions of Psychological Science,* 14(3), 135-138.

Bowlby, J. (1969). *Attachment and Loss, Volume 1.* London: Hogarth.

Brazil, A. (2017). Exploring Critical Incidents and Postexposure Management in a Volunteer Fire Service. *Journal of Aggression, Maltreatment & Trauma,* 26(3), 244-257.

Breslau, N., Davis, G.C., Andreski, P. (1995). Risk factors for PTSD-related traumatic events: A prospective analysis. *The American Journal of Psychiatry,* 152(4), 529-535.

Briggs, S. R., & Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality,* 54, 106–148.

Brockhouse, R., Msetfi, R.M., Cohen, K., & Joseph, S. (2011). Vicarious exposure to trauma and growth in therapists: The moderating effects of sense of coherence, organizational support, and empathy. *Journal of Traumatic Stress,* 24(6), 735-742.

Brooks, N., & Matson, R. (1982). Social-psychological adjustment to multiple sclerosis: A longitudinal study. *Social Science and Medicine,* 16, 2129-2135.

Brough, P. (2004). Comparing the Influence of Traumatic and Organizational Stressors on the Psychological Health of Police, Fire and Ambulance Officers. *International Journal of Stress Management,* 11(3), 227-244.

Brown, J., Mulhern, G., & Joseph, S. (2002), Incident-related stressors, locus of control, coping, and psychological distress among firefighters in Northern Ireland. *Journal of Traumatic Stress,* 15(2), 161–168.

Brunet, J., McDonough, M.H., Hadd, V., Crocker, P.R.E., & Sabiston, C.M. (2010). The Posttraumatic Growth Inventory: an examination of the factor structure and invariance among breast cancer survivors. *Psycho-Oncology,* 19(8), 830-838.

Brunsden, V., Hill, R., McTernan, J., & Shuttlewood, A. (2011). Under Fire: Firefighter's Coping with Aggression and Violence. *International Fire Service Journal of Leadership and Management,* 5, 15-22.

Brunsden, V., Hill, R., & Maguire, K. (2012). The impact of process issues on stress interventions in the emergency services. In C. Biron, & M. Karanika-Murray, & G.L. Cooper (Eds.). *Improving Organizational Interventions for Stress and Well-Being,* (pp. 238-257). London: Routledge.

Brunsden, V., & Lawrence, L. (2012). An occupational hazard: managing traumatic incidents in the fire and rescue service. In R. Johnson, & R. Haigh (Eds.). *Complex Trauma and its Effects: Perspectives on creating an environment for recovery,* (pp.155-161). Hove: Pavilion.

Bryant, R. A., & Harvey, A. G. (1996), Posttraumatic stress reactions in volunteer firefighters. *Journal of Traumatic Stress,* 9(1), 51–62.

Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research,* 6(1), 97-113.

Bulmer, M. (1979). Concepts in the analysis of qualitative data. *The Sociological Review,* 27, 651-677.

Burke, K. J., Shakespeare-Finch, J., Paton, D., & Ryan, M. (2006). Characterizing the resilient officer: Individual attributes at point of entry to policing. *Traumatology, 12*(3), 178-188.

Burt, M.R., & Katz, B.L. (1987). Dimensions of Recovery from Rape. *Journal of Interpersonal Violence,* 2(1), 57-81.

Butler, L.D., Blasey, C.M., Garlan, R.W., McCaslin, S.E., Azarow, J., Chen, X., Desjardins, J.C., DiMiceli, S., Seagraves, D.A., Hastings, T.A., Kraemer, H.C., Spiegel, D. (2005). Posttraumatic Growth Following the Terrorist Attacks of September 11, 2001: Cognitive, Coping, and

Trauma Symptom Predictors in an Internet Convenience Sample. *Traumatology,* 11(4), 247-267.

Caballero, C. L., Walker, A. , Fuller-Tyszkiewicz, M. (2011). The work readiness scale (WRS): Developing a measure to assess work readiness in college graduates. *Journal of Teaching and Learning for Graduate Employability*, 2(2), 41-54.

Cadell, S., Regehr, C., & Hemsworth, D. (2003), Factors Contributing to Posttraumatic Growth: A Proposed Structural Equation Model. *American Journal of Orthopsychiatry,* 73(3) 279–287.

Calhoun, L.G., Cann, A., & Tedeschi, R.G. (2010). The Posttraumatic growth model: Sociocultural considerations. In T.Weiss & R.Berger (Eds.). *Posttraumatic growth and culturally competent practice.* (pp.1-14). Hoboken, NJ: John Wiley

Calhoun, L.G., & Tedeschi, R.G. (1998). Posttraumatic growth: Future directions. In R.G. Tedeschi, C.L. Park, & L.G. Calhoun (Eds.). *Posttraumatic growth. Positive changes in the aftermath of crisis.* (pp. 215-238). Mahwah, NJ: Lawrence Erlbaum Associates Inc.

Calhoun, L.G., & Tedeschi, R.G. (2013). Posttraumatic Growth in Clinical Practice. Hove: Routledge.

Calhoun, L.G., Tedeschi, R.G., Cann, A. & Hanks, E.A. (2010). Positive Outcomes Following Bereavement: Paths to Posttraumatic Growth. *Psychologica Belgica,* 50(1-2), 125-143.

Calhoun, L.G., Tedeschi, R.G.,Fulmer, D.,& Harlan, D. (2000). August. *Parental bereavement, rumination and posttraumatic growth.* Poster session presented at the meeting of the American Psychological Association. Washington.DC.

Cann, A., Calhoun, L.G., Tedeschi, R.G., Kilmer, R.P., Gil-Rivas, V., Vishnevsky, T., & Danhauer, S.C. (2010). The Core Beliefs Inventory: a brief measure of disruption in the assumptive world. *Anxiety, Stress & Coping, 23(1),* 19-34.

Cann, A., Calhoun, L.G., Tedeschi, R.G., & Solomon, D.T. (2010). Posttraumatic Growth and Depreciation as Independent Experiences and Predictors of Well-Being. *Journal of Loss and Trauma,* 15(3), 151-66.

Cann, A., Calhoun, L.G., Tedeschi, R.G., Triplett, K.N., Vishnevsky, T., & Lindstrom, C.M. (2011). Assessing posttraumatic cognitive processes: the Event Related Rumination Inventory. *Anxiety, Stress, & Coping,* 24(2), 126-134.

Carlier, I. V.E., Lamberts, R.D., Gersons, B.P.R. (2000). The dimensionality of trauma: a multidimensional scaling comparison of police officers with and without posttraumatic stress disorder. *Psychiatry Research,* 97, 29-39.

Carnelley, K. B., Wortman, C. B., Bolger, N., & Burke, C. T. (2006). The time course of grief reactions to spousal loss: Evidence from a national probability sample. *Journal of Personality and Social Psychology, 91*(3), 476-492.

Carver, C.S. (1998). Resilience and thriving: Issues, models and linkages. *Journal of Social Issues,* 54, 245-265.

Carver, C. S., & Antoni, M. H. (2004). Finding Benefit in Breast Cancer During the Year After Diagnosis Predicts Better Adjustment 5 to 8 Years After Diagnosis. *Health Psychology, 23*(6), 595-598.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*(2), 267-283.

Chamberlin, M.J.A., & Green, H.J. (2010). Stress and coping strategies among firefighters and recruits. *Journal of Loss and Trauma: International Perspectives on Stress and Coping,* 15(6), 548-560.

Chang, C., Lee, L., Connor, K.M., Davidson, J.R.T., Jefferies, K., & Lai, T. (2003). Posttraumatic Distress and Coping Strategies Among Rescue Workers after an earthquake. *The Journal of Nervous and Mental Disease,* 191(6), 391-398.

Charmaz, K. (1990). Discovering Chronic Illness: Using Grounded Theory. *Social Sciences and Medicine,* 30(11), 1161-1172.

Charmaz, K. (2006). *Constructing grounded theory: a practical guide through qualitative analysis: A practical Guide through qualitative analysis.* London: Sage Publications Ltd.

Charney, D.S. (2004). Psychobiological mechanisms of resilience and vulnerability: Implications for successful adaptation to extreme stress. *American Journal of Psychiatry,* 161, 195-216.

Childs, M., Morris, M., & Ingham, V. (2004) The rise and rise of clean, white-collar (fire-fighting) work. *Disaster, Prevention and Management,* 13(5), 409-414.

Cho, D., & Park, C.L. (2013). Growth Following Trauma: Overview and Current Status. *Terapia Psicologica,* 31(1), 69-79.

Cobb, A.R., Tedeschi, R.G., Calhoun, L.G., Cann, A. (2006). Correlates of Posttraumatic Growth in Survivors of Intimate Partner Violence. *Journal of Traumatic Stress,* 19(6), 895-903.

Collins, P. (1998). 'Negotiating Selves: Reflections on 'Unstructured' Interviewing'. *Sociological Research Online,* 3(3), Retrieved from http://www.socresonline.org.uk/3/3/2.html

Collins, R.L., Taylor, S.E., & Skokan, L.A. (1990). A Better World or a Shattered Vision? Changes in Life Perspectives Following Victimization. *Social Cognition,* 8(3), pp. 263-285.

Connor, K. M., & Davidson, J. R.T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety,* 18, 76–82.

Cordova, M. J., Cunningham, L. L. C., Carlson, C. R., & Andrykowski, M. A. (2001). Posttraumatic growth following breast cancer: A controlled comparison study. *Health Psychology, 20*(3), 176-185.

Corneil, W., Beaton, R., Murphy, S., Johnson, C., & Pike, K. (1999). Exposure to traumatic incidents and prevalence of posttraumatic stress symptomatology in urban firefighters in two countries. *Journal of Occupational Health Psychology, 4*(2), 131-141.

Costa, P.T., & McCrae, R.R. (1985). *The NEO Personality Inventory manual.* Odessa, FL: Psychological Assessment Resources.

Costa, P. T., & McCrae, R. R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological Assessment, 4*(1), 5-13.

Cresswell, J.W., & Plano Clark, V.L. (2007). *Designing and Conducting Mixed Methods Research.* Thousand Oaks, CA: Sage.

Cruddas, S. (2013). An introduction to structural equation modelling for emergency services and disaster research. *International Journal of Emergency Services,* 2(2), 131-140.

Curbow, B., Somerfield, M. R., Baker, F., Wingard, J.R., & Legro, M.W.(1993).Personal changes, dispositional optimism, and psychological adjustment to bone marrow transplantation . *Journal of Behavioral Medicine*, 16(, 423 – 443 .

Danhauer, S.C., Russell, G.B., Tedeschi, R.G., Jesse, M.T., Vishnevsky, T., Daley, K., Carroll, S., Triplett, K.N., Calhoun, L.G., Cann, A., & Powell, B.L. (2013). A Longitudinal Investigation of Posttraumatic Growth in Adult Patients Undergoing Treatment for Acute Leukemia. *Journal of Clinical Psychology in Medical Settings,* 20(1), 13-24.

Davis, C. G., Nolen-Hoeksema, S., & Larson, J. (1998). Making sense of loss and benefiting from the experience: Two construals of meaning. *Journal of Personality and Social Psychology, 75*(2), 561-574.

Dekel, S., Ein-Dor, T. & Solomon, Z. (2012). Posttraumatic growth and posttraumatic distress: A longitudinal study. *Psychological Trauma: Theory, Research, Practice, and Policy*, *4*, 94–101.

Del Ben, K., Scotti, J., Chen, C., & Fortson, B. (2006). Prevalence of posttraumatic stress disorder symptoms in firefighters. *Work and Stress*, *20(1)* 37-48.

Denscombe, M. (2008). Communities of Practice: A Research Paradigm for the Mixed Methods Approach. *Journal of Mixed Methods Research,* 2(3), 270-283.

Denzin, N. (2001). The reflexive interview and a performative social science. *Qualitative Research,* 1, 23-46.

DeShon, R. P. (1998). A cautionary note on measurement error corrections in structural equation models. *Psychological Methods, 3*(4), 412-423.

DeVellis, R.F. (2012). *Scale Development Theory and Applications*. London: Sage.

Dirik, G., & Karanci, A.N. (2008). Variables Related to Posttraumatic Growth in Turkish Rheumatoid Arthritis Patients. *Journal of Clinical Psychology in Medical Settings,* 15(3), 193-203.

Durkin, John (2010) *Psychological growth following adversity: the role of social support.* PhD thesis, University of Nottingham.

Durkin, J., & Joseph, S. (2009). Growth Following Adversity and Its Relation with Subjective Well-Being and Psychological Well-Being. *Journal of Loss and Trauma,* 14(3), 228-234.

Elmqvist, C., Brunt, D., Fridlund, B., & Ekebergh, M. (2009). Being first on the scene of an accident – experiences of 'doing' prehospital emergency care. *Scandinavian Journal of Caring Sciences,* 24, 266-273.

Erbes, C., Eberly, R., Dikel, T., Johnsen, E., Harris, I., & Engdahl, B. (2005). Posttraumatic Growth among American Former Prisoners of War. *Traumatology, 11*(4), 285-295.

Evans, R., Pistrang, N., & Billings, J. (2013). Police Officer's experience of supportive and unsupportive social interactions following traumatic incidents. *European Journal of Psychotraumatology,* 4(1),

Evers, A. W. M., Kraaimaat, F. W., van Lankveld, W., Jongen, P. J. H., Jacobs, J. W. G., & Bijlsma, J. W. J. (2001). Beyond unfavorable thinking: The Illness Cognition Questionnaire for chronic diseases. *Journal of Consulting and Clinical Psychology, 69*(6), 1026-1036.

Fabricatore, J., Azen, S., Schoentgen, S., & Snibbe, H. (1978), Predicting performance of police officers using the sixteen personality factor questionnaire. *American Journal of Community Psychology,* 6(1), 63–70.

Fannin, N., & Dabbs, J.M. (2003). Testosterone and the work of firefighters: Fighting fires and delivering medical care. *Journal of Research in Personality,* 37(2), 107-115.

Feder, A., Southwick, S.M., Goetz, R.R., Wang, Y., Alonso, A., Smith, B.W., Bachholz, K.R., Waldeck, T., Ameli, R., Moore, J., Hain, R., Charney, D.S., & Vythilingam, M. (2008).

Posttraumatic Growth in Former Vietnam Prisoners of War. *Psychiatry: Interpersonal and Biological Processes,* 71(4), 359-370.

Feilzer, M.Y. (2010). Doing Mixed Methods Research Pragmatically: Implications for Rediscovery of Pragmatism as a Research Paradigm. *Journal of Mixed Methods Research,* 4(1), 6-16.

Filipp, S.H. (1999). A three-stage model of coping with loss and trauma. In A. Maercker, M Schutzwohl, & Z. Solomon (Eds.). *Posttraumatic stress disorder: A lifespan developmental perspective* (pp. 43-78). Seattle, WA: Hogrefe and Huber.

Fire Brigades Union (2013). Retrieved on the 19th January 2016 from https://www.fbu.org.uk/

Fire Brigades Union (2017). Retrieved on the 1st December 2017 from https://www.fbu.org.uk/

Fleeson, W., Malanos, A. B., & Achille, N. M. (2002). An intraindividual process approach to the relationship between extraversion and positive affect: Is acting extraverted as "good" as being extraverted? *Journal of Personality and Social Psychology, 83*(6), 1409-1422.

Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment, 9*(4), 445-451.

Foa, E. B., McLean, C. P., Zang, Y., Zhong, J., Rauch, S., Porter, Knowles, K., Powers, M.B., & Kauffman, B. Y. (2016). Psychometric properties of the Posttraumatic Stress Disorder Symptom Scale Interview for DSM–5 (PSSI–5). *Psychological Assessment, 28*(10), 1159-1165.

Folkman, S., & Lazarus, R. (1980). An Analysis of Coping in a Middle-Aged Community Sample. *Journal of Health and Social Behavior, 21*(3), 219-239.

Folkman, S., & Lazarus, R. S. (1985). If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology, 48*(1), 150-170.

Fontana, A., & Frey, J. (2000). The interview: from structured questions to negotiated text. In N. Denzin, & Y. Lincoln (Eds.). *Handbook of qualitative research (2nd Ed),* (pp. 645-672). Thousand Oaks CA: Sage Publications.

Ford, J.D., Tennen, H., & Albert, D. (2008). A Contrarian View of Growth Following Adversity. In S.Joseph, & A. Linley (Eds.). *Trauma, Recovery, and Growth: Positive Psychological Perspectives on Posttraumatic Stress,* (pp. 297-324). Hoboken, New Jersey: John Wiley & Sons, Inc.

Frazier, P., Conlon, A. & Glaser, T. (2001). Positive and negative life changes following sexual assault. *Journal of Consulting and Clinical Psychology*, *69*, 1048–1055.

Frazier, P. A., & Kaler, M. E. (2006). Assessing the validity of self-reported stress-related growth. *Journal of Consulting and Clinical Psychology, 74*(5), 859-869.

Frazier, P., Tennen, H., Gavian, M., Park, C., Tomich, P., Tashiro, T. (2009). Does Self-Reported Posttraumatic Growth Refect Genuine Positive change? *Psychological Science,* 20(7), 912-191.

Friborg, O., Hjemdal, O., Rosenvinge, J.H., & Martinussen, M. (2003). A new rating scale for adult resilience: what are the central protective resources behind healthy adjustment? *International journal of methods in Psychiatric Research,* 12, 65-76.

Fullerton, C.S., McCarroll, J.E., Ursano, R.J., & Wright, K.M. (1992). Psychological Responses of Rescue Workers: Fire Fighters and Trauma. *American Journal of Orthopsychiatry,* 62(3), 371-378.

Furr, R.M. (2011). *Scale Construction and Psychometrics for Social and Personality Psychology*. London: Sage.

Galvin, L.R., & Godfrey, H.P.D. (2001). The impact of coping on emotional adjustment to spinal cord injury (SCI): review of the literature and application of a stress appraisal and coping formulation. *Spinal Cord,* 39, 615-627.

Garnefski, N., Kraaij, V., Schroevers, M.J., & Somsen, G.A. (2008). Post-Traumatic Growth After a Myocardial Infarction: A Matter of Personality, Psychological Health, or Cognitive Coping? *Journal of Clinical Psychology of Medical Settings,* 15, 270-277.

Ghezeljeh, T.N., & Emami, A. (2009). Grounded Theory: methodology and philosophical perspective. *Nurse Researcher,* 17(1), 15-23.

Gist, R., & Woodall, S. J. (1998). Social science versus social movements: The origins and natural history of debriefing. *Australasian Journal of Disaster and Trauma Studies, 2*(1).

Glaser, B.G., & Strauss, A.L (1967). *The Discovery of Grounded Theory.* Chicago, IL: Transaction.

Glaser, B.G. (1978). *Theoretical sensitivity. Advances in the Methodology of Grounded Theory.* Mill Valley CA: Sociology Press.

Goldberg, L.R. (1999). A broad-bandwith, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I Mervielde, I.Deary, F.De Fruyt, & F.Ostendorf (Eds.). *Personality psychology in Europe, vol.7.* Tilburg, The Netherlands: Tilberg University Press.

Goldberg, L.R., Johnson, J.A., Eber, H.W., Hogan, R., Ashton, M.C., Cloninger, C.R., & Gough, H.G. (2006). The international personality item pool and the future of public-domain personality measures. *Journal of Research in Personality,* 40, 84-96.

Gosling, S.D., Rentfrow, P.J., & Swann, W.B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality,* 37(6), 504-528.

Greene, P., Kane, D., Christ, G., Lynch, S., Corrigan, M., (2006). *FDNY Crisis Counselling Inovative Responses to 9/11 Firefighters, Families, and Communities.* Hoboken, New Jersey: Wiley & Sons, Inc.

Groleau, J.M., Calhoun, L.G., Cann, A., & Tedeschi, R.G. (2013). The Role of Centrality of Events in Posttraumatic Distress and Posttraumatic. *Psychological Trauma, Theory, Research, Practice, and Policy,* 5(5), 477-483.

Hallberg, L.M. (2006). The "core category" of grounded theory: making constant comparisons. *International Journal of Qualitative Studies on Health and Well-Being,* 1(3), 141-148.

Halpern, J., Gurevich, M., Schwartz, B., & Brazeau, P. (2009). What makes an incident critical for ambulance workers? Emotional outcomes and implications for intervention. *An International Journal of Work, Health, & Organisations.* 23(2), 173-189.

Hammersley, M. (1985). Ethnography: What it is and what it does. In: S. Hegarty & P. Evans (Eds). *Research and Evaluation methods in special education: Quantitative and qualitative techniques in case study work* (pp. 152-163). Windsor: Nefar-Nelson.

Hanson, B. (2008). Wither qualitative/quantitative? Grounds for methodological convergence. *Quality and Quantity,* 42, 97-111.

Harris, I. (2003). What Does "The Discovery of Grounded Theory" Have to Say to Medical Education? *Advances in Health Sciences Education,* 8, 49-61.

Harvey, J.H., Barnett, K., Overstreet, A. (2004).Trauma Growth and Other Outcomes Attendant to Loss. *Psychological Inquiry,* 15(1), 26-29.

Haslam, S.A. (2004). *Psychology in Organisations: The social identity approach* (2nd ed.) London: Sage.

Haslam, C., & Mallon, K. (2003). A preliminary investigation of post-traumatic stress symptoms among firefighters. *Work & Stress,* 17(3), 277-285.

Haslam, S.A., O'Brien, A., Jetten, J., Vormedal, K., & Penna, S. (2005). Taking the strain: Social identity, social support, and the experience of stress. *British Journal of Social Psychology,* 44(3), 355-370.

Heinrichs, M., Wagner, D., Schoch, W., Soravia, L.M., Hellhammer, D.H., & Ehlert, U. (2005). Predicting Posttraumatic Stress Symptoms from Pre-traumatic Risk Factors: A 2-year Prospective Follow-Up Study in Firefighters. *American Journal of Psychiatry,* 162(12), 2276-2286.

Helgeson, V. S., Reynolds, K. A., & Tomich, P. L. (2006). A meta-analytic review of benefit finding and growth. *Journal of Consulting and Clinical Psychology, 74(5), 797-816.*

Henwood, K.L., & Pidgeon, N.F. (1992). Qualitative research and psychological theorizing. *British Journal of Psychology,* 83, 97-111.

Hill, R. & Brunsden, V. (2009). 'Heroes' as victims: role reversal in the Fire and Rescue Service. *The Irish Journal of Psychology. 30(1),* 73-84.

Ho, S. M.Y., Chan, C. L.W., & Ho, R. T.H. (2004), Posttraumatic growth in Chinese cancer survivors. *Psycho-Oncology,* 13(6), 377–389.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513-524.

Hobfoll, S. E., Hall, B. J., Canetti-Nisim, D., Galea, S., Johnson, R. J., & Palmieri, P. A. (2007), Refining our Understanding of Traumatic Growth in the Face of Terrorism: Moving from Meaning Cognitions to Doing what is Meaningful. *Applied Psychology,* 56(3), 345–366.

Home Office. (2017). *Fire and rescue workforce and pension statistics: England April 2016 to March 2017.* London, United Kingdom.

Horowitz, M. J. (1976) *Stress Response Syndromes* (1st edn). Northvale, NJ: Aronson.

Howe, K.R. (1988). Against the quantitative-qualitative incompatibility thesis, or, Dogmas, die hard. *Educational Researcher,* 17, 10-16.

Hoyle, R.H. (2011). *Structural Equation Modelling for Social and Personality Psychology.* London: Sage.

Hoyle, R.H., & Panter, A.T. (1995). Writing about structural equation models. In R.H. Hoyle (Ed.). *Structural equation modeling.* (pp. 158-176). Thousand Oaks, CA: Sage.

Hoyt, T., Pasupathi, M., Smith, B. W., Yeater, E. A., Kay, V. S., & Tooley, E. (2010). Disclosure of emotional events in groups at risk for posttraumatic stress disorder. *International Journal of Stress Management, 17*(1), 78-95.

Hui, W., Shi, W., Xu, D., Wang, J., Wu, W., & Men, K. (2001). Influencing factors of posttraumatic stress disorder in the shipwreck related military rescuers in Yantai. *Chinese Mental Health Journal,* 15, 148-149.

Hyatt-Burkhart, D. (2014). The Experience of Vicarious Posttraumatic Growth in Mental Health Workers. *Journal of Loss and Trauma,* 19, 452-461.

Ickovics, J.R., Meade, C.S., Kershaw, T.S., Milan, S., Ethier, K.A., & Lewis, J.B. (2006). Urban Teens: Trauma, Posttraumatic Growth and Emotional Distress Among Female Adolescents. *Journal of Consulting and Clinical Psychology,* 74(5), 841-850.

Jaccard, J., & Wan, C. (1996). *LISEL approaches to interaction effects in multiple regression.* Thousand oaks, CA: Sage.

Jackson, D.L. (2001). Sample size and number of parameter estimates in maximum likelihood confirmatory factor analysis: A Monte Carlo Investigation. *Structural Equation Modeling,* 8, 205-223.

Jackson, D.L. (2003). Revisiting sample size and number of parameter etimates: Some support for the N:q hypothesis. *Structural Equation Modeling,* 10, 128-141.

Janoff-Bulman, R. (1985). The aftermath of victimization: Rebuilding shattered assumptions. In C. Figley (Ed). *Trauma And its Wake volume 1: The Study and Treatment of Post-traumatic Stress Disorder,* (pp. 15-35). Brunner: Mazel.

Janoff-Bulman, R. (1989). Assumptive Worlds and the Stress of Traumatic Events: Applications of the Schema Construct. *Social Cognition,* 7(2), 113-136.

Janoff-Bulman, R. (1992). *Shattered assumptions: Towards a new psychology of trauma.* New York: Free Press.

Janoff-Bulman, R. (2004). Posttraumatic Growth: Three Explanatory Models. *Psychological Inquiry,* 15(1), 30-34.

Jayawickreme E., & Blackie L. E. R. (2014). Post-traumatic Growth as Positive Personality Change: Evidence, Controversies and Future Directions. *European Journal of Personality,* 28(4), 312–331.

Jia, X., Ying, L., Zhou, X., Wu, X., & Lin, C. (2015). The Effects of Extraversion, Social Support on the Posttraumatic Stress Disorder and Posttraumatic Growth of Adolescent Survivors of the Wenchuan Earthquake. *PLoS ONE* 10(3): Retrieved from https://doi.org/10.1371/journal.pone.0121480

Jin, Y., Xu, J., & D. (2014). The relationship between post-traumatic stress disorder and post traumatic growth: gender differences in PTG and PTSD subgroups. *Social Psychiatry and Psychiatric Epidemiology* 49(12), 1903-1910.

Johnson, D., & Creech, J. (1983). Ordinal Measures in Multiple Indicator Models: A Simulation Study of Categorization Error. *American Sociological Review, 48*(3), 398-407.

Johnson, R.B., & Onwuegbuzie, A.J. (2004). Mixed methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher,* 33(7), 14-26.

Johnson, R.B., Onwuegbuzie, A.J., & Turner, L.A. (2007). Towards a Definition of Mixed Methods Research. *Journal of Mixed Methods Research,* 1(2), 112-133).

Johnson, R. J., Hobfoll, S. E., Hall, B. J., Canetti-Nisim, D., Galea, S., & Palmieri, P. A. (2007), Posttraumatic Growth: Action and Reaction. *Applied Psychology,* 56(3), 428–436.

Johnson, S. F., & Boals, A. (2015). Refining our ability to measure posttraumatic growth. *Psychological Trauma: Theory, Research, Practice, and Policy, 7*(5), 422-429.

Jöreskog, K. G., & Sörbom, D. (1982). Recent developments in structural equation modeling. *Journal of marketing research,* 404-416.

Joseph, S. (2011). Religiosity and posttraumatic growth: a note concerning the problems of confounding in their measurement and the inclusion of religiosity within the definition of posttraumatic growth. *Mental Health, Religion & Culture,* 14(8), 843-845.

Joseph, S. (2012). *What Doesn't Kill Us: The new psychology of posttraumatic growth.* London: Piatkus.

Joseph, S., & Butler, L.D. (2010). Positive changes following adversity. *PTSD Research Quarterly,* 21(3), 1-8.

Joseph, S., & Linley, P.A. (2005). Positive Adhustment to Threatening Events: An Organismic Valuing Theory of Growth Through Adversity. *Review of General Psychology,* 9(3), 262-280.

Joseph, S., & Linley, P.A. (2006). Growth following adversity: Theoretical perspectives and implications for clinical practice. *Clinical Psychology Review,* 26, 1041-1053.

Joseph, S., & Linley, P.A. (2008). Psychological Assessment of Growth following Adversity: A Review. In S.Joseph & P.A. Linley (Eds.). *Trauma, Recovery and Growth: Positive Psychological Perspectives on Posttraumatic Stress* (pp. 21-91). Hoboken, New Jersey: John Wiley & Sons Inc.

Joseph, S., Murphy, D., & Regel, S. (2012). An Affective-Cognitive Processing Model of Post-Traumatic Growth. *Clinical Psychology and Psychotherapy,* 19, 316-325.

Joseph, S., Williams, R., & Yule, W. (1993). Changes in outlook following disaster: The preliminary development of a measure to assess positive and negative responses. *Journal of Traumatic Stress,* 6, 271-279.

Kamen, C., Vorasarun, C., Canning, T., Kienitz, E., Weiss, C., Flores, S., Etter, D., Lee, S., & Gore-Felton, C. (2016). *Journal of Clinical Psycholgy in Medical Settings,* 23(2), 126-134.

Karanci, A.N., Isikli, S., Aker, A.T, Gul, E.I., Erkan, B.B., Ozkol, H., & Guzel, H.Y. (2012). Personality, posttraumatic stress and trauma type: factors contributing to posttraumatic growth and its domains in a Turkish community sample. *European Journal of Psychotraumatology,* 3(1).

Kashdan, T.B., & Kane, J.P. (2011). Post-traumatic distress and the presence of post-traumatic growth and meaning in life: Experiential avoidance as a moderator. *Personality and Individual Differences,* 50(1), 84-89.

Kehl, D., Knuth, D., Hulse, L., Schmidt, S. (2014). Posttraumatic Reactions among Firefighters after Critical Incidents: Cross-National Data. *Journal of Aggression, Maltreatment & Trauma,* 23, 842-853.

Kessler, R. C. (2000). Posttraumatic stress disorder: The burden to the individual and to society. *The Journal of Clinical Psychiatry, 61*(Suppl 5), 4-14.

Keszei, A.P., Novak, M., & Streiner, D.L. (2010). Introduction to health measurement scales. *Journal of Psychosomatic research,* 68(4), 319-323.

Keyes, C. L. M., Shmotkin, D., & Ryff, C. D. (2002). Optimizing well-being: The empirical encounter of two traditions. *Journal of Personality and Social Psychology, 82*(6), 1007-1022.

Khan, M. (2013). Academic Self-Efficacy, Coping, and Academic Performance in College. *International Journal of Undergraduate Research and Creative Activities, 5(4), 1-11.*

Kirby, R., Shakespeare-Finch, J., & Palk, G. (2011). Adaptive and Maladaptive Coping Strategies Predict Posttrauma Outcomes in Ambulance Personnel. *Traumatology,* 17(4), 25-34.

Kirschman, E. (2004). *I love a fire fighter: What the family needs to know*. New York: Guilford Press.

Klee, S., & Renner, K. (2013). In search of the "Rescue Personality". A questionnaire study with emergency medical services personnel. *Personality and Individual Differences,* 54(5), 669-672.

Kleim, B. & Ehlers, A. (2009). Evidence for a curvilinear relationship between posttraumatic growth and posttraumatic depression and PTSD in assault survivors. *Journal of Traumatic Stress*, *22*, 45–52.

Kline, R.B. (1998). *Principles and practice of structural equation modeling.* New York: Guilford.

Koocher, G.P., & Rev-Casserly, C.M. (2003). Ethical issues in psychological assessment in J.R. Graham & J.A. Naglieri (Eds) *Handbook of Psychology: Assessment Psychology* (volume 10), pp.165-180 Hobken, NJ: John Wiley & Sons Inc.

Kuhlman,T. L. (1988). Gallows humor for a scaffold setting—Managing aggressive patients on a maximum-security forensic unit. *Hospital and Community Psychiatry*, 39 ,1085 – 1090.

Kunst, M. J. J. (2010). Peritraumatic distress, posttraumatic stress disorder symptoms, and posttraumatic growth in victims of violence. *Journal of Traumatic Stress*, *23*, 514–518.

Kuzel, A. J. (1992). Sampling in qualitative inquiry. In B. F. Crabtree & W. L. Miller (Eds.), *Research methods for primary care, Vol. 3. Doing qualitative research* (pp. 31-44). Thousand Oaks, CA: Sage Publications.

Kvale, S. (2007). *Doing Interviews.* London: Sage.

Lambert, J.E., Benight, C.C., Harrison, E., & Cieslak, R. (2012). The Firefighter Coping Self-Efficacy Scale: measure development and validation. *Anxiety, Stress & Coping,* 25(1), 79-91.

Lancaster, S.L., Klein, K.R., Nadia, C., Szabo, L., Mogerman, B. (2015). An Integrated Model of Posttraumatic Stress and Growth. *Journal of Trauma and Disassociation,* 16(4), 399-418.

Landen, S.M., Wang, C.D.C. (2010). Adult attachment, work cohesion, coping, and psychological well-being of firefighters. *Counselling Psychology Quarterly,* 23(2), 143-162.

Laufer, A., Solomon, Z. (2006). Posttraumatic Symptoms and Posttraumatic Growth Among Israeli Youth Exposed to Terror Incidents. *Journal of Social and Clinical Psychology,* 25(4), 429-447.

Lawrence, L., & Barber, G. (2004). Debriefing in the Fire Service. *Counselling at Work,* Winter, 11-13.

Lazarus, R.S. (1991). *Emotion & Adaptation*. New York, NY: Oxford University Press.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing.

LeBlanc, V.R., Regehr, C., Birze, A., King, K., Scott, A.K., MacDonald, R., & Tavares, W. (2011). The Association Between Posttraumatic Stress, Coping, and Acute Stress Responses in Paramedics. *Traumatology,* 17(4), 10-16.

Lechner, S., & Antoni, M. (2004). Posttraumatic Growth and Group-Based Interventions for Persons Dealing with Cancer: What Have We Learned so Far? *Psychological Inquiry, 15*(1), 35-41.

Lee, J., Ahn, Y., Jeong, K., Chae, J., & Choi, K. (2014). Resilience buffers the impact of traumatic events on the development of PTSD symptoms in firefighters. *Journal of Affective Disorders,* 162, 128-133.

Lehman, D.R., Davis, C.G., Delongis, A., Wortman, C.B, Bluck, S., Mandel, D.R., & Ellard, J.H (1993). Positive and Negative Life Changes Following Bereavement and their Relations to Adjustment. *Journal of Social and Clinical Psychology,* 12(1), pp. 90-112.

Lepore, S. J., & Revenson, T. A. (2006). Resilience and posttraumatic growth: Recovery, resistance, and reconfiguration. In L. G. Calhoun & R. G. Tedeschi (Eds.). *Handbook of posttraumatic growth: Research and practice* (pp. 24-46). Mahwah, NJ: Erlbaum

Levine, S. Z., Laufer, A., Stein, E., Hamama-Raz, Y. & Solomon, Z. (2009). Examining the relationship between resilience and posttraumatic growth. *Journal of Traumatic Stress*, *22*, 282–286.

Levy-Gigi, E., Bonanno, G.A., Shapiro, A.R., Richter-Levin, G., Keri, S., & Sheppes, G. (2016). Emotion Regulatory Flexibility Sheds Light on the Elusive Relationship Between Repeated Traumatic Exposure and Posttraumatic Stress Disorder Symptoms. *Clinical Psychological Science,* 4(1), 28-39.

Lindstrom, C.M., Cann, A., Calhoun, L.G., & Tedeschi, R.G.(2013). The Relationship of Core Belief Challenge, Rumination, Disclosure, and Sociocultural Elements to Posttraumatic Growth. *Psychological Trauma, Theory, Research, Practice and Policy,* 5(1), 50-55.

Lindy, J.D. (1985). The Trauma Membrane and Other Clinical Concepts Derived from Psychotherapeutic Work with Survivors of Natural Disasters. *Psychiatric Annals,* 15(3), 153-160.

Linley, P.A., & Joseph, S. (2004). Positive Change Following Trauma and Adversity: A Review. *Journal of Traumatic Stress,* 17(1), 11-21.

Linley, P.A., Joseph, S., Cooper, R., Harris, S., & Meyer, C. (2003). Positive and Negative Changes Following Vicarious Exposure to the September 11 Terrorist Attacks. *Journal of Traumatic Stress,* 16(5), 481-485.

Linley, P.A., Joseph, S., & Goodfellow, B. (2008). Positive Changes in Outlook Following Trauma and Their Relationship to Subsequent Posttraumatic Stress, Depression, and Anxiety. *Journal of Social and Clinical Psychology*, 27(8), 877-891.

Linton, M., Dieppe, P., & Medina-Lara, A. (2016). Review of 99 self-report measures for assessing well-being in adults: exploring dimensions of well-being and developments over time. *British Medical Journal Open,* 6, 1-16.

MacCallum, R.C., Browne, M.W., & Sugawara, H.M. (1996). Power analysis and determination of sample size for covariance structure models. *Psychological Methods,* 1, 130-149.

Maercker, A., & Zoellner, T. (2004). The Janus Face of Self-Perceived Growth: Toward a Two-Component Model of Posttraumatic Growth. *Psychological Inquiry, 15*(1), 41-48.

233

Marshall, R, E., Milligan-Saville, J.S., Mitchell, P.B., Bryant, R.A., & Harvey, B. (2017). A systematic review of the usefulness of pre-employment and pre-duty screening in predicting mental health outcomes amongst emergency workers. *Psychiatry Research,* 253, 129-137.

Martens, M.P. (2005). The use of structural equation modeling in counselling psychology research. *The Counseling Psychologist,* 33, 369-298.

Martin, B.G. (1989). Gender Differences in Salary Expectations when Current Salary Information is provided. *Psychology of Women,* 13, 87-96.

Martin, L.L., & Tesser, A. (1996). Clarifying our thoughts. In R.S. Wyer (Ed.). *Ruminative thought: Advances in Social Cognition.*(Vol.9, pp.189-209). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Matheson, K., Manning, R., & Williams, S. (2011). From Brigade to Service: An Examination of the Role of Fire and Rescue Service in Modern Local Government. *Local Government Studies,* 37(4), 451-465.

Matheson, K., Manning, R., & Williams, S. (2012). Examining a typology of fire service-related anti-social behaviour. *Crime prevention and community safety,* 14(3), 182-195.

Mays, N., & Pope, C. (2000). Qualitative Research in Health Care: Assessing Quality in Qualitative Research. *British Medical Journal,* 320, 50-52.

McCammon, S., Durham, T., Allison, E. & Williamson, J. (1988). Emergency workers' cognitive appraisal and coping with traumatic events. *Journal of Traumatic Stress,* 1(3)*,* 353-372.

McCaslin, S. E., de Zoysa, P., Butler, L. D., Hart, S., Marmar, C. R., Metzler, T. J. & Koopman, C. (2009). The relationship of posttraumatic growth to peritraumatic reactions and posttraumatic stress symptoms among Sri Lankan university students. *Journal of Traumatic Stress*, *22*, 334–339.

McCrae, R.R., & Costa, P.T. (1999). The Five-Factor Theory of Personality. In O.P. John, R.W. Robins, & L.A. Pervin (Eds.). *Handbook of Personality – Theory and Research (3rd Ed),* (pp. 159-181). London: Guildford Press

McMillen, J.C. (2004). Posttraumatic Growth: What's It All About? *Psychological Inquiry,* 15(1), 48-52.

McMillen, J.C., & Fisher, R.H. (1998). The Perceived Benefit Scales: Measuring perceived positive life changes after negative events. *Social Work Research, 22, 3(1), 173-187.*

Meyer, E.C., Zimmering, R., Daly, E., Knight, J., Kamholz, W., & Gulliver, S.B. (2012). Predictors of Posttraumatic Stress Disorder and other Psychological Symptoms in Trauma-Exposed Firefighters. *Psychological Services,* 9(1), 1-15.

Milam, J. (2004). Posttraumatic Growth Among HIV/AIDS Patients. *Journal of Applied Social Psychology,* 34(11), 2353-2376.

Miles, J., & Shevlin, (2001). *Applying Regression & Correlation: A Guide for Students and Researchers.* London: Sage.

Mills, J., Bonner, A., & Francis, K. (2006). Adopting a constructivist approach to grounded theory: Implications for research design. *International Journal of Nursing Practice,* 12, 8-13.

Mitchell, J.T. (1983). When disaster strikes….The critical incident stress debriefing process. *Journal of Emergency Medical Services,* 8, 36-39.

Mitchell, J. T., & Bray, G. P. (1990). Emergency services stress: Guidelines for preserving the health and careers of emergency services personnel. Englewood Cliffs, NJ: Prentice-Hall.

Moffitt, J., Bostock, J., & Cave, A. (2014). Promoting well-being and reducing stigma about mental health in the fire service. *Journal of Public Mental Health,* 13(2), 103-113.

Morgan, J. K., & Desmarais, S. L. (2017). Associations between time since event and posttraumatic growth among military veterans. *Military Psychology, 29*(5), 456-463.

Morris, B.A., Skakespeare-Finch, J., Rieck, M., & Newbery, J. (2005). Multidimensional Nature of Posttraumatic Growth in an Australian Population. *Journal of Traumatic Stress,* 18(5), 575-585.

Morris, B. A., Shakespeare-Finch, J., & Scott, J. L. (2007). Coping processes and dimensions of posttraumatic growth. *Australasian Journal of Disaster and Trauma Studies,* 1, 1-10.

Morse, J.M. (2001). Situating grounded theory within qualitative inquiry. In R.S. Shreiber, & P.N. Stern (Eds.). *Using Grounded Theory in Nursing,* (pp.1-16). New York: Springer.

Mystakidou, K., Tsilika, E., Parpa, E., Kyriakopoulos, D., Malamos, N., & Damigos, D. (2008). Personal growth and psychological distress in advanced breast cancer. *The Breast,* 17(4), 382-386.

Nardi, P.M. (2014). *Doing Survey Research.* Abingdon: Routledge.

Nerken, I.R. (1993). Grief and the reflective self: Toward a clearer model of loss resolution and growth. *Death Studies,* 17(1), 1-26.

Niculita, Z. (2013). Personality Traits that Foster Ambulance Workers Professional Performance. *Procedia – Social and Behavioral Sciences,* 78(13), 385-389.

Nietzsche, F. (1997/1889). *Twilight of the idols,* or, *How to philosophize with the hammer.* (R.Polt, Trans.) Indianapolis, IN: Hackett.

Nightingale, J., & Williams, R. M. (2000). Attitudes to emotional expression and personality in predicting post-traumatic stress disorder. *British Journal of Clinical Psychology,* 39(3), 243–254.

Norlander, T., Schedvin, H., & Archer, T. (2005). Thriving as a function of affective personality: relation to personality factors, coping strategies and stress. *Anxiety, Stress, & Coping,* 18(2), 105-116.

O'Connor, D. (2001). Journeying the quagmire: Exploring the discourses that shape the qualitative research process. *Affilia,* 16(2), 138-158.

Office of National Statistics. (2017). *Overview of the UK population: July 2017.* London, United Kingdom: Melissa Randall.

Oginska- Bulik, N., & Kobylarczyk, M. (2015). Relation between Resiliency and Post-Traumatic Growth in a Group of Paramedics-The Mediating Role of Coping Strategies. *International Journal of Occupational Medicine and Environmental Health,* 28(4), 707-719.

O'Leary, V.E., & Ickovics, J.R (1995). Resilience and thriving in response to challenge: an opportunity for a paradigm shift in women's health. *Womens Health, 1(2),* 121-42.

O'Leary, V.E., Alday, C.S., & Ickovics, J.E. (1998). Models of life change and Posttraumatic growth. In R.G. Tedeschi, & C.L. Park, & L.G. Calhoun (Eds.). *Posttraumatic Growth: Positive changes in the Aftermath of Crisis,* (pp.125-149). London: Routledge.

Ong, A. D., Bergeman, C. S., Bisconti, T. L., & Wallace, K. A. (2006). Psychological resilience, positive emotions, and successful adaptation to stress in later life. *Journal of Personality and Social Psychology, 91*(4), 730-749.

Onwuegbuzie, A. J., & Leech, N. L. (2004). Enhancing the Interpretation of Significant Findings: The Role of Mixed Methods Research. *The Qualitative Report*, *9*(4), 770-792.

O'Rourke, J.J.F., Tallmann, B.A., Altmaier, E.M. (2008). Measuring post-traumatic changes in spirituality/religiosity. *Mental Health, Religion & Culture,* 11(7), 719-728.

Ozer, E.J., Best, S.R., Lipsey, T.L., & Weiss, D.S. (2003). Predictors of Posttraumatic Stress Disorder and Symptoms in Adults: A Meta-Analysis. *Psychological Bulletin,* 129(1), 52-73.

Pallant, J. (2013). *SPSS Survival Manual: A Step By Step Guide to Data Analysis Using IBM SPSS (5th Ed).* Berkshire: Open University Press.

Pals, J.L., & McAdams, D.P. (2004). The Transformed Self: A Narrative Understanding of Posttraumatic Growth. *Psychological Inquiry,* 15(1), 65-69.

Park, C. L., Aldwin, C. M., Fenster, J. R., & Snyder, L. B. (2008), Pathways to Posttraumatic Growth Versus Posttraumatic Stress: Coping and Emotional Reactions Following the September 11, 2001, Terrorist Attacks. *American Journal of Orthopsychiatry,* 78,300–312.

Park, C. L., Cohen, L. H., & Murch, R. L. (1996), Assessment and Prediction of Stress-Related Growth. *Journal of Personality,* 64(1), 71–105.

Park, C.L., Cohen, L.H., & Murch, R.L. (1998). Assessment and Prediction of Stress-Related Growth. *Journal of Personality,* 64(1), 71-105.

Park, C.L., Edmondson, D., Fenster, J.R., & Blank, T.O. (2008). Meaning making and Psychological Adjustment Following Cancer: The Mediating Roles of Growth, Life Meaning, and Restored Just-World Beliefs. *Journal of Consulting and Clinical Psychology,* 76(5), 863-875.

Park, C.L.,& Fenster, J.R. (2004). Stress-Related Growth: Predictors of Occurrence and Correlates with Psychological Adjustment. *Journal of Social and Clinical Psychology,* 23(2), 195-215.

Park, C. L., & Helgeson, V. S. (2006). Introduction to the special section: Growth following highly stressful life events-Current status and future directions. *Journal of Consulting and Clinical Psychology, 74*(5), 791-796.

Pat-Horenczyk, R., & Brom, D. (2007). The Multiple Faces of Post-Traumatic Growth. *Applied Psychology,* 56(3), 379–385.

Paton, D. (2003). Expanding perspectives on duty-related traumatic stress. *Australasian Journal of Disaster and Trauma Studies*, *2003(1)*, Retrieved July 30, 2016 from http://www.massey.ac.nz/~trauma/issues/2003-1/editorial.htm.

Paton, D. (2005). Posttraumatic growth in protective services professionals: Individual, cognitive and organizational influences. *Traumatology, 11*(4), 335-346.

Paton, D. (2006). Posttraumatic growth in disaster and emergency work. In L.G. Calhoun & R.G. Tedeschi (Ed.s), *Handbook of Posttraumatic* growth (pp. 225-247). New Jersey: Lawrence Erlbaum Associates, Inc.

Peltzer, K. (2000). Trauma symptom correlates of criminal victimization in an urban community sample, South Africa. *Journal of Psychology in Africa; South of the Sahara, the Caribbean, and Afro-Latin America, 10*(1), 49-62.

Peng, L., Zhang, J., Li, M., Li, P., Zhang, Y., Zuo, X., Miao, Y., & Xu, Y. (2012). Negative life events and mental health of Chinese medical students: The effect of resilience, personality and social support. *Psychiatry Research,* 196(1), 138-141.

Peterson, C., & Seligman, M.E.P. (2003). Character Strengths Before And After September 11. *Psychological Science,* 14(4), 381-384.

Pinto, R. J., Henriques, S. P., Jongenelen, I., Carvalho, C., & Maia, Â. C. (2015), The Strongest Correlates of PTSD for Firefighters: Number, Recency, Frequency, or Perceived Threat of Traumatic Events?. *Journal of Traumatic Stress,* 28(5), 434–440.

Polatinsky, S., & Esprey, Y. (2000). An assessment of gender differences in the perception of benefit resulting from the loss of a child. *Journal of Traumatic Stress,* 13(4), 709–718.

Pollard, C., & Kennedy, P. (2007). A longitudinal analysis of emotional impact, coping strategies and post-traumatic psychological growth following spinal cord injury: A 10-year review. *British Journal of Health Psychology,* 12(3), 347–362.

Powell, S., Rosner, R., Butollo, W., Tedeschi, R. G., & Calhoun, L. G. (2003). Posttraumatic growth after war: A study with former refugees and displaced people in Sarajevo. *Journal of Clinical Psychology,* 59(1), 71–83.

Prati, G., & Pietrantoni, L. (2009). Optimism, Social Support, and Coping Strategies As Factors Contributing to Posttraumatic Growth: A Meta-Analysis. *Journal of Loss and Trauma,* 14(5), 364-388.

Purc-Stephenson, R. J. (2014). The Posttraumatic Growth Inventory: Factor structure and invariance among persons with chronic diseases. *Rehabilitation Psychology, 59*(1), 10-18.

Ramos, C., & Leal, L. (2013). Posttraumatic Growth in the Aftermath of Trauma: A Literature Review About Related Factors and Application Contexts. *Psychology, Community & Health,* 2(1), 43-54.

Rana, T.A. (2013). Post-traumatic over-optimism. *The Psychologist,* 26(1), 5.

Reeves, S., Kuper, A., & Hodges, B.D. (2008). Qualitative research methodologies: Ethnography. *British Medical Journal,* 337, 512-514.

Reeves, S., Peller, J., Goldman, J., & Kitto, S. (2013). Ethnography in qualitative educational research. *Medical Teacher,* 35, 1365-1379.

Regehr, C. (2009). Social support as a mediator of psychological distress in firefighters. *The Irish Journal of Psychology, 30(1-2)*, 87-98.

Regehr, C., Dimitropoulos, G., Bright, E., George, S., & Henderson, J. (2005). Behind the brotherhood: Rewards and challenges for wives of firefighters. *Family Relations, 54*, 423-435.

Regehr, C., Goldberg, G., Clancy, G.D., & Knott, T. (2002). Posttraumatic Symptoms and Disability in Paramedics. *The Canadian Journal of Psychiatry,* 47(10), 953-958.

Regehr, C., Goldberg, G. & Hughes, J. (2002). Exposure to human tragedy, empathy, and trauma in ambulance paramedics. *American Journal of Orthopsychiatry, 72(4)*, 505-513.

Regehr, C., Hemsworth, D., & Hill, J. (2001). Individual Predictors of Posttraumatic Distress: A Structural Equation Model. *Canadian Journal of Psychiatry,* 46(2), 156-161.

Regehr, C., Hill, J., & Clancy, G. (2000). Individual Predictors of Traumatic Reactions in Firefighters. *The Journal of Nervous and Mental Disease,* 188(6), 333-339.

Regehr, C., Hill, J., Knott, T., & Sault, B. (2003). Social support, self-efficacy and trauma in new recruits and experienced firefighters. *Stress and Health: Journal of the International Society for the Investigation of Stress, 19(4)*, 189-193.

Reif, L. V., Patton, M. J., & Gold, P. B. (1995). Bereavement, stress, and social support in members of a self-help group. *Journal of Community Psychology,* 23, 292–306.

Reker, G., & Wong, P. (1984). Psychological and Physical Well-Being in the Elderly: The Perceived Well-Being Scale (PWB). *Canadian Journal on Aging,* 3(1), 23-32.

Richards, H., & Schwartz, L. (2002). Ethics of qualitative research. Are there special issues for health services research? *Family Practice,* 19, 135-139.

Ritchie, J., & Lewis, J. (2003). *Qualitative Research Practice: A Guide for Social Science Students and Researchers.* London: Sage.

Robson, C. (2011). *Real world research (3rd Ed.)*. West Sussex: John Wiley & Sons.

Robson, C., & McCartan, K. (2016). *Real World Research (4th Ed).* West Sussex: John Wiley & Sons.

Rogler, L.H. (1999). Methodological sources of cultural insensitivity in mental health research. *American Psychologist,* 54, 424-433.

Rossman, G.B., & Wilson, B.L. (1985). Numbers and words: Combining quantitative and qualitative methods in a single large-scale evaluation study. *Evaluation Review,* 9, 627-643.

Rowe, A. & Regehr, C. (2010). Whatever gets you through today: An examination of cynical humour among emergency service professionals. *Journal of Loss and Trauma: International Perspectives on Stress and Coping, 15(5),* 448-464.

Ryff, C.D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57(6),* 1069-1081.

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69*(4), 719-727.

Salsman, J. M., Segerstrom, S. C., Brechting, E. H., Carlson, C. R., & Andrykowski, M. A. (2009). Posttraumatic growth and PTSD symptomatology among colorectal cancer survivors: a 3-month longitudinal examination of cognitive processing. *Psycho-Oncology,* 18, 30–41.

Salters-Pedneault, K., Ruef, A.M., & Orr, S.P. (2010). Personality and psychophysiological profiles of police officer and firefighter recruits. *Personality and Individual Differences,* 49, 210-215.

Sattler D. N., Boyd B., & Kirsch J. (2014) Trauma-exposed Firefighters: Relationships among Posttraumatic Growth, Posttraumatic Stress, Resource Availability, Coping and Critical Incident Stress Debriefing Experience, *Stress & Health,* 30(5), 356–365.

Sawatzky, R., Ratner, P.A., Johnson, J.L., Kopec, J.A, & Zumbo, B.D (2010). Self-reported physical and mental health status and quality of life in adolescents: a latent variable mediation model. *Health and Quality of Life Outcomes,* 8(17).

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 4*(3), 219-247.

Scheier, M.F., Carver, C.S., & Bridges, M.W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67*(6), 1063-1078.

Scheier, M.F., Carver, C.S., & Bridges, M.W. (2001). Optimism, pessimism, and psychological well-being. In E.C. Chang (Ed.). *Optimism and pessimism: Implications for theory, research, and practice* (pp.189-216)*. Washington, DC: American Psychological Association; 2001.

Schreiber, J.B., Nora, A., Stage, F.K., Barlow, E.A., & King, J. (2006). Reporting Structural Equation Modeling and Confirmatory Factor Analysis Results: A Review. *Journal of Educational Research,* 99(6), 323-337.

Schulz, E., Mohamed, N. E. (2004). Turning the tide: Benefit finding after cancer surgery. *Social Science & Medicine,* 59, 653-662.

Schwarzer, R., & Schwarzer, C. (1996). A Critical Survey of Coping Instruments. In M. Zeidner & N.S Endler (Eds.). *Handbook of Coping* (pp.1-18). New York: Wiley.

Sears, S. R., Stanton, A. L., & Danoff-Burg, S. (2003). The yellow brick road and the emerald city: Benefit finding, positive reappraisal coping, and posttraumatic growth in women with early-stage breast cancer. *Health Psychology,* 22, 487–497.

Shakespeare-Finch, J., & Barrington, A. J. (2012). Behavioural changes add validity to the construct of posttraumatic growth. *Journal of Traumatic Stress,* 25, 433–439.

Shakespeare-Finch, J., & Copping, A. (2006). A Grounded Theory Approach to Understanding Cultural Differences in Posttraumatic Growth. *Journal of Loss and Trauma,* 5, 355-371.

Shakespeare-Finch, J. & Enders, T. (2008). Corroborating evidence of posttraumatic growth. *Journal of Traumatic Stress*, *21*, 421–424.

Shakespeare-Finch, J., Gow, K. & Smith, S. (2005). Personality, Coping and Posttraumatic Growth in Emergency Ambulance Personnel. *Traumatology,* 11(4), 325-334.

Shakespeare-Finch, J., & Lurie-Beck, J. (2014). A meta-analytic clarification of the relationship between posttraumatic growth and symptoms of posttraumatic distress disorder. *Journal of Anxiety Disorders,* 28(2), 223-229.

Shakespeare-Finch, J., & Martinek, E., Tedeschi, R.G., & Calhoun, L.G. (2013). A qualitative approach to assessing the validity of the posttraumatic growth inventory. *Journal of Loss and Trauma,* 18(6), 572-591.

Shakespeare-Finch, J., Rees, A., & Armstrong, D. (2015). Social Support, Self-efficacy, Trauma and Well-Being in Emergency Medical Dispatchers. *Social Indicators Research,* 123(2), 549-565.

Shakespeare-Finch, J., Smith, S., Gow, K., Embleton, G., & Baird, L. (2003). The prevalence of posttraumatic growth in emergency ambulance personnel. *Traumatology,* 9(1), 58-71.

Shaw, A., Joseph, S., & Linley, P.A. (2005). Religion, spirituality, and posttraumatic growth: a systematic review. *Mental Health, Religion & Culture,* 8(1), 1-11.

Sheikh, A.I. (2004). Posttraumatic Growth in the Context of Heart Disease. *Journal of Clinical Psychology in Medical Settings,* 11(4), 265-273.

Sheikh, A.I., & Marotta, S.A (2005). A Cross-Validation Study of the Posttraumatic Growth Inventory. *Measurement and Evaluation in Counseling and Development,* 38(2), 66-77.

Siegel, K., & Schrimshaw, E.W. (2000). Perceiving benefits in adversity: Stress related growth in women living with HIV/AIDS. *Social Science and Medicine,* 51, 1543-1554.

Skeffington, P.M., Rees, C.S., Mazzucchelli, T.G., Kane, R.T. (2016). The Primary Prevention of PTSD in Firefighters: Preliminary Results of an RCT with 12-Month Follow-Up. *PLOS One,* 11(7), 1-22.

Skeffington, P.M., Rees, C.S., & Mazzucchelli, T. (2017). Trauma exposure and post-traumatic stress disorder within fire and emergency services in Western Australia. *Australian Journal of Psychology,* 69, 20-28.

Slavin-Spenny, O.M., Cohen, J.L., Oberleitner, L.M., & Lumley, M.A. (2011). The Effects of Different Methods of Emotional Disclosure: Differentiating Post-Traumatic Growth from Stress Symptoms. *Journal of Clinical Psychology,* 67(10), 993-1007.

Smith, B.W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine,* 15(3), 194-200.

Smith, S.G., & Cook, S.L. (2004). Are Reports of Posttraumatic Growth Positively Biased? *Journal of Traumatic Stress,* 17(4), 353-358.

Solberg, N.L., & Segerstrom, S.C. (2006). Dispositional optimism and coping: A meta-analytic review. *Personality and Social Psychology Review ,* 10(3), 235 – 251.

Spitzer, R.L., Williams, J.B.W., Gibbon, M., First, M.B. (1990). *Structured Clinical Interview for DSM—II-R-Patient ed.* Washington D.C: American Psychiatric Press.

Splevins, K.A., Cohen, K., Joseph, S., Murray, C., & Bowley, J. (2010). Vicarious Posttraumatic Growth Among Interpreters. *Qualitative Health Research,* 20(12), 1705-1716.

Steiger, J.H (1990). Structural model evaluation and modification: An internal estimation approach. *Multivariate Behavioral Research,* 25, 173-180.

Strauss, A., & Corbin, J. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory (2nd Ed).* Thousand Oaks, CA: Sage.

Streiner, D.L. (2006). Building a Better Model: An introduction to Structural Equation Modelling. *The Canadian Journal of Psychiatry,* 51(5), 317-323.

Stroebe, M.S., & Schut, H. (1999). The dual process model of coping with bereavement: Rationale and description. *Death Studies,* 23, 197-224.

Sumalla, E.C., Ochoa, C.B., Blanco, I. (2009). Posttraumatic growth in cancer: reality and illusion? *Clinical Psychology Review,* 29(1), 24-33.

Tabachnick, B.G., & Fidell, L.S. (2014). *Using multivariate statistics (6th Ed)*. Harlow: Pearson.

Taku, K. (2011). Commonly-defined and individually-defined posttraumatic growth in the US and Japan. *Personality and Individual Differences,* 51(2), 188-193.

Taku, K. (2013). Posttraumatic Growth in American and Japanese Men: Comparing Levels of Growth and Perceptions of Indicators of Growth. *Psychology of Men and Masculinity,* 14(4), 423-432.

Taku, K., & Cann, A. (2014). Cross-National and Religious Relationships With Posttraumatic Growth, The Role of Individual Differences and Perceptions of the Triggering Event. *Journal of Cross-Cultural Psychology,* 45(4), 601-617.

Taku, K., Cann, A., Calhoun, L.G., & Tedeschi, R.G. (2008). The Factor Structure of the Posttraumatic Growth Inventory: A Comparison of Five Models Using Confirmatory Factor Analysis. *Journal of Traumatic Stress,* 21(2), 158-164.

Taku,K., Calhoun, L.G., Tedeschi, R.G., Gil-Rivas, V., Kilmer, R.P., & Cann, A. (2007). Examining posttraumatic growth among Japanese university students. *Anxiety, Stress, & Coping,* 20(4), 353-367.

Taku, K., Cann, A., Tedeschi, R.G., & Calhoun, L. (2009). Intrusive versus deliberate rumination in posttraumatic growth across US and Japanese samples. *Anxiety, Stress and Coping,* 22(2), 129-136.

Taku, K., Cann, A., Tedeschi, R. G., & Calhoun, L. G. (2015). Core beliefs shaken by an earthquake correlate with posttraumatic growth. *Psychological Trauma: Theory, Research, Practice, and Policy, 7*(6), 563-569.

Taku, K., & Oshio, A. (2015). An item-level analysis of the Posttraumatic Growth Inventory: Relationships with the examination of core beliefs and deliberate rumination. *Personality and Individual Differences,* 86, 156-160.

Taku, K., Tedeschi, R.G., Cann, A., & Calhoun. L.G. (2009). The Culture of Disclosure: Effects of Perceived Reactions to Disclosure on Posttraumatic Growth and Distress in Japan. *Journal of Social and Clinical Psychology,*28(10), 1226-1243.

Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist, 38*(11), 1161-1173.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103*(2), 193-210.

Tedeschi, R. G., & Calhoun, L. G. (1993). Using the support group to respond to the isolation of bereavement. *Journal of Mental Health Counseling, 15*(1), 47-54.

Tedeschi, R.G., & Calhoun, L.G. (1995). *Trauma and transformation: Growing in the aftermath of suffering.* Newbury Park, CA: Sage.

Tedeschi, R.G., & Calhoun, L.G. (1996). The Posttraumatic Growth Inventory: Measuring the Positive Legacy of Trauma. *Journal of Traumatic Stress,* 9(3), 455-471.

Tedeschi, R. G., Calhoun, L. G., & Cann, A. (2007). Evaluating Resource Gain: Understanding and *Misunderstanding* Posttraumatic Growth. *Applied Psychology,* 56(3), 396–406.

Tedeschi, R.G., Park, C.L, & Calhoun, L.G (1998). Posttraumatic growth: Conceptual issues in R.G. Tedeschi, & C.L. Park, & L.G. Calhoun (Eds). *Posttraumatic growth: Theory and research on change in the aftermath of crisis,* (pp. 1-22). NJ: Lawrence Erlbaum.

Tedeschi, R.G., & Calhoun, L.G. (2004). Posttraumatic Growth: Conceptual Foundations and Empirical Evidence. *Psychological Enquiry,* 15(1*),* 1-18.

Tedeschi, R.G., Cann, A., Taku,K., Senol-Durak, E., Calhoun, L.G. (2017). The Posttraumatic Growth Inventory: A Revision Integrating Existential and Spiritual Change. *Journal of Traumatic Stress,* 30, 11-18.

Teixeira, R.J., & Pereira, M.G. (2013). Growth and Cancer Caregiving Experience: Psychometric Properties of the Portuguese Posttraumatic Growth Inventory. *Families, Systems & Health,* 31(4), 382-395.

Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., Parkinson, J., Secker, J., & Stewart-Brown, S. (2007). The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): development and UK validation. *Health and Quality of Life Outcomes,* 5(63), 1-13.

Tennen, H., & Affleck, G. (1998). In R.G. Tedeschi, & C.L. Park, & L.G. Calhoun (Eds.). *Posttraumatic Growth: Positive changes in the Aftermath of Crisis,* (pp.65-123). London: Routledge.

Thomas, G., & James, D. (2006). Reinventing grounded theory: some questions about theory, ground and discovery. *British Educational Research Journal,* 32(6), 767-795.

Thurnell-Read, T., & Parker, A. (2008). Men, masculinities and firefighting: occupational identity, shop-floor culture and organisational change. *Emotion, Space and Society,* 1, 127-134.

Triplett, K.N., Tedeschi, R.G., Cann, A., Calhoun, L.G., Reeve, C.L. (2012). Posttraumatic Growth, Meaning in Life and Life Satisfaction in Response to Trauma. *Psychological Trauma, Theory, Research, Practice, and Policy,* 4(4), 400-410.

Tucker, L.R. and Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis, *Psychometrika,* 38, 1-10.

Tuckey, M. R., & Hayward, R. (2011), Global and Occupation-Specific Emotional Resources as Buffers against the Emotional Demands of Fire-Fighting. *Applied Psychology,* 60(1), 1–23.

Urcuyo, K.R., Boyers, A.E., Carver, C.S., & Antoni, M.H. (2005). Finding benefit in breast cancer: Relations with personality, coping, and concurrent well-being. *Psychology and Health,* 2, 175-192.

Vasquez, C., Cervellon, P., Perez-Sales, P., Vidales, D., Gaborit, M. (2005). Positive emotions in earthquake survivors in El Salvador (2001). *Anxiety Disorders,* 19, 313-328.

Vingerhoets, A., & Van Heck, G. (1990). Gender, coping and psychosomatic symptoms. *Psychological Medicine,* 20(1), 125-135.

Vishnevsky, T., Cann, A., Calhoun, L. G., Tedeschi, R. G., & Demakis, G. J. (2010). GENDER DIFFERENCES IN SELF-REPORTED POSTTRAUMATIC GROWTH: A META-ANALYSIS. *Psychology of Women Quarterly,* 34, 110–120.

Wagner, S. L. (2005). The "rescue personality": Fact or fiction? *The Australasian Journal of Disaster and Trauma Studies, 2005*(2), 1-14.

Wagner, B., Forstmeier, S., & Maercker, A. (2007). Posttraumatic Growth as a Cognitive Process with Behavioral Components: A Commentary on Hobfoll et al. (2007). *Applied Psychology,* 56(3), 407–416.

Wagner, S.L., Martin, C.A., & McFee, J.A. (2009). Investigating the "Rescue Personality". *Traumatology,* 15(3), 5-12.

Wagner, S. L., McFee, J. A., & Martin, C. A. (2010). Mental health implications of fire service membership. *Traumatology, 16*(2), 26-32.

Webster, J.D., & Deng, X.C. (2015). Paths from Trauma to Intrapersonal Strength: Worldview, Posttraumatic Growth, and Wisdom. *Journal of Loss and Trauma,* 20, 253-266.

Webster, S., Patterson, A., Hoare, J., & O'Loughlin, A. (2007). *Violence at work: Findings from the 2005/06 and 2006/07 British Crime Survey.* Bootle: Health & Safety Executive.

Weinrib, A. Z., Rothrock, N. E., Johnsen, E. L., & Lutgendorf, S. K. (2006). The assessment and validity of stress-related growth in a community-based sample. *Journal of Consulting and Clinical Psychology, 74*(5), 851-858.

Weiss, T. (2002). Posttraumatic Growth in Women with Breast Cancer and Their Husbands. *Journal of Psychosocial Oncology,* 20(2), 65-80.

Weiss, T., & Berger, R. (2006). Reliability and Validity of a Spanish Version of the Posttraumatic Inventory. *Research on Social Work Practice,* 16(2), 191-199.

Weiss, T., & Berger, R. (2008). Posttraumatic Growth and Immigration: Theory, Research and Practice Implications. In S. Joseph, & P.A. Linley (Eds.). *Trauma, Recovery and Growth: Positive Psychological Perspectives on Posttraumatic Stress,* (pp.93-102). Hoboken, New Jersey: John Wiley & Sons Inc.

Weiss, D. S., Marmar, C. R., Metzler, T. J., & Ronfeldt, H. M. (1995). Predicting symptomatic distress in emergency services personnel. *Journal of Consulting and Clinical Psychology, 63*(3), 361-368.

Weston, R., & Gore, P.A. (2006). A Brief Guide to Structural Equation Modeling. *The Counseling Psychologist,* 34(5), 719-751.

Westphal, M., & Bonanno, G. A. (2007), Posttraumatic Growth and Resilience to Trauma: Different Sides of the Same Coin or Different Coins?. *Applied Psychology,* 56(3), 417–427.

Wild, N.D., & Paivio, S.C. (2004). Psychological Adjustment, Coping, and Emotion Regulation as Predictors of Posttraumatic Growth. *Journal of Aggression, Maltreatment, & Trauma,* 8(4), 97-122.

Willig, C. (2001). *Introducing qualitative research in psychology: Adventures in theory and method.* Buckingham: Open University Press.

Willig, C. (2008). *Introducing qualitative research in psychology: Adventures in theory and method* (2nd Ed.). Buckingham: Open University Press.

Windle, G., Bennett, K.M., & Noyes, J. (2011). A methodological review of resilience measurement scales. *Health and Quality of Life Outcomes,* 9:8, 1-18.

Wortman, C.B. (2004). Posttraumatic Growth: Progress and Problems. *Psychological Inquiry,* 15(1), 81-90.

Wright, R., Powell, M.B., & Ridge, D. (2006). "Child abuse investigation: An in-depth analysis of how police officers perceive and cope with daily work challenges". *Policing: An International Journal of Police Strategies & Management,* 29(3), 498-512.

Wu, C.V., & Beaunae, C. (2014). Personal relections on cautions and considerations for navigating the path of grounded theory doctoral theses and dissertations: a long walk through a dark forest. *International Journal of Social Research Methodology,* 17(3), 249-265.

Wu, K., Zhang, Y., Liu, Z., Zhou, P., & Wei, C. (2015). Coexistence and determinants of posttraumatic stress disorder and posttraumatic growth among Chinese survivors after earthquake: role of resilience and rumination. *Frontiers in Psychology,* 6, 1-9.

Xu, J., & Liao, Q. (2011). Prevalence and predictors of posttraumatic growth among adult survivors one year following 2008 Sichuan earthquake. *Journal of Affective Disorders,* 133(1-2), 274-280.

Yanez, B.R., Stanton, A.L., Hoyt, M.A., Tennen, H., & Lechner, S. (2011). Understanding Perceptions of Benefit Following Adversity: How Do Distinct Assessments of Growth Relate to Coping and Adjustment to Stressful Events? *Journal of Social and Clinical Psychology,* 30(7), 699-721.

Yeung, N. C. Y., Lu, Q., Wong, C. C. Y., & Huynh, H. C. (2016). The roles of needs satisfaction, cognitive appraisals, and coping strategies in promoting posttraumatic growth: A stress and coping perspective. *Psychological Trauma: Theory, Research, Practice, and Policy, 8*(3), 284-292.

Zerach, G., Solomon, Z., Cohen, A., & Ein-Dor, T. (2013). PTSD, Resilience and Posttraumatic Growth Among Ex-Prisoners of War and Combat Veterans. *The Israel Journal of Psychiatry and Related Sciences,* 50(2), 91-99.

Znoj, H. (2005, August). International Perspectives on posttraumatic growth: PTG from a European perspective. In R. Tedeschi (chair), *International Perspectives on Posttraumatic Growth.* Symposium conducted at the 113th Annual Convention of the American Psychological Association, Washington, DC.

Zoellner, T., & Maercker, A. (2006). Posttraumatic growth in clinical psychology — A critical review and introduction of a two component model. *Clinical Psychological Review,* 26(5), 626-653.

Zoellner, T., Rabe, S., Karl, A., & Maercker, A. (2008). Posttraumatic growth in accident survivors: openness and optimism as predictors of its constructive or illusory sides. *Journal of Clinical Psychology,* 64(3), 245–263.

Zoellner, T., Rabe, S., Karl, A., Maercker, A. (2011). Post-traumatic growth as outcome of a cognitive-behavioural therapy trial for motor vehicle accident survivors with PTSD. *Psychology and Psychotherapy,* 84(2), 201-213.

Zuckerman, M., Gagne, M. (2003). The COPE Revised: Proposing a 5-factor model of coping strategies. *Journal of Research in Personality,* 37, 169-204.